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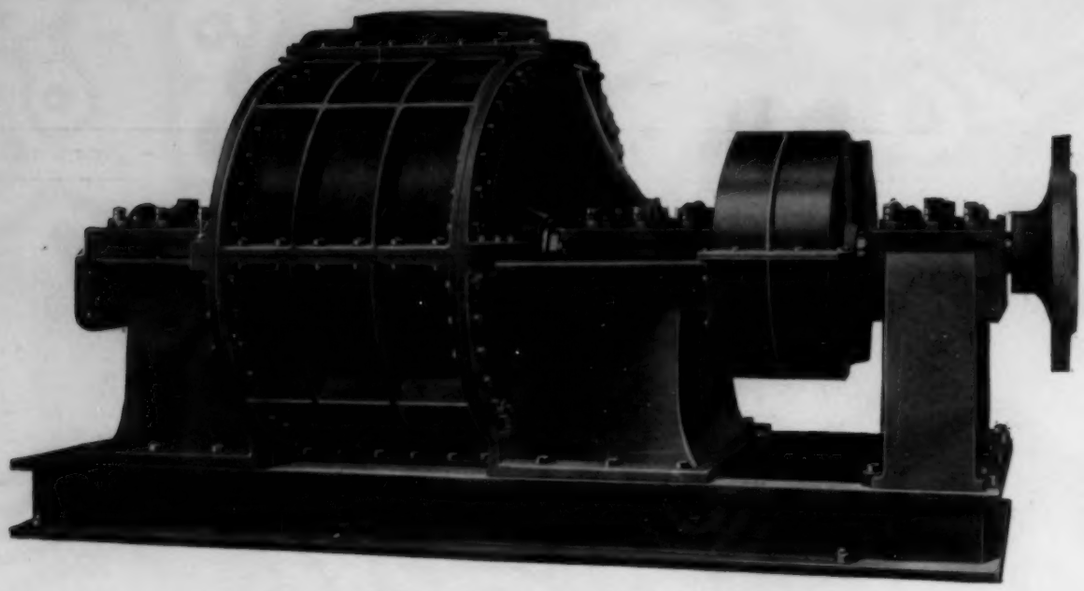

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THE IRON TRADE REVIEW

Vol. LX Cleveland, April 19, 1917 No. 16

Government Needs Sway Market

Virtually All Private Transactions in Steel Now Dependent on Whether Nation's Needs of This Material Are Predominant—Buyers Accept Inconvenience and Loss in Patriotic Spirit—1919 Rail Buying Begins

GOVERNMENT buying, actual and prospective, of iron and steel products for war purposes thoroughly dominates the market. Practically every transaction being closed in steel materials is answerable to the question whether this tonnage now or later will be required for the national good. In some lines, this effect is becoming rather drastic. Original purchases are being cut down severely, either by definite act of makers or by non-shipment. Despite the great inconvenience and actual losses being sustained, consumers universally are meeting the situation in a spirit of broad patriotism and liberality which greatly has helped producers to make the necessary readjustments.

Government Buying

Some large purchases are being made in various lines by the government, full details of which, for obvious reasons, are withheld. These include steel for naval vessels, for munitions, for navy yard and shop enlargements, and for a multiplicity of other needs. Fabricated steel requirements now in sight are placed at 63,000 tons and total needs definitely expressed represent several hundred thousand tons. Various large industrial companies are holding their shops at the government's disposal for munition manufacture, which will call for a large tonnage of steel. Inquiry of this sort now is current.

Buyers Still Active

An interesting development of the week has been the opening of negotiations for steel rails for early 1919 delivery. Several hundred thousand tons are under inquiry. Some tonnage for that position has been booked. This activity illustrates the continued buying impulse among consumers of finished steel. The Northern Pacific bought 40,000 tons of rails for last quarter of next year, the French government two lots of 20,000 tons each, and the Italian government 15,000 tons. Foreign railroad demands are large. Despite the prospect of increased difficulties in getting deliveries, because of the government's presence in the market, there is no diminution on the part of domestic buyers to cover themselves far in the future where they have business sufficiently in hand and in form to warrant this action. Automobile manufacturers are endeavoring to buy on some lines for 1918 delivery or beyond any date they had previously covered. Finished products have been steadily increasing in price. Wire is up $3 to $6, with independent makers, sheet bars for third quarter have been fixed at $80, mill, and there have been sales at this figure, and cast iron pipe again is higher. Increased difficulties to get mill deliveries have boosted warehouse quotations all along the line.

Pig Iron

Pig iron is moving on. Buying for 1918 delivery has been maintained actively and as makers have accumulated good order books, up to 75 per cent of capacity in some cases, prices for this year and for the first six months of next year gradually are converging. For northern iron, $40, furnace, for this year more commonly is a minimum for basic, foundry or malleable, with as high as $45 asked. A small sale at Buffalo has been made at $45. For next year, $37 to $40, furnace, prevails. Alabama for this year still is offered at $35, furnace, for No. 2, and at $33 for the first half of 1918. Virginia is at $40 for this year, while the leading producer has withdrawn $35 for next year. Some furnaces are reluctant to quote beyond the first quarter of next year because of new ore costs that then must be taken into account. Well distributed buying of iron has marked the week. A Canton steelmaker took 20,000 tons of additional basic; the Bethlehem Steel Co., 11,700 tons of bessemer, and an automobile casting company with plants principally in northern Ohio, 12,000 tons of northern foundry.

Export inquiry is being resumed extensively after a recent lull. Japan has bought basic in good amount and seeks further tonnages. Furnace operations are more constant by reason of better coke shipments, due to increased car supply, which for the first time in months has been 100 per cent. Spot coke consequently is easier. Ferro-manganese continues its spectacular course. Carload sales have been made at $400 and $425, seaboard, and $500 has been quoted.

THE OPEN HEARTH

The Armor Plate Site

SKEPTICS long have doubted that Secretary of the Navy Daniels will proceed with the erection of a government armor plant. They have not changed their minds because of the fact that the secretary has made public part of the report of the naval board which recommended that the plant be located in the "Pittsburgh district", and has named Charleston, W. Va., as the point of selection. However sincere he may be in saying that work on "the plant will be commenced at once and driven to completion", the thought cannot be avoided that Mr. Daniels faces many apparently insuperable obstacles to carry out his announced program. Under prevailing industrial conditions he has small opportunity of getting in the near future the necessary and special machinery for the plant; moveover, part of this equipment must come from the shops of the very steel companies with which the government will compete as a maker of armor plate; the navy department does not possess anything resembling the highly specialized organization required to supervise the manufacture of armor plate, and Mr. Daniels has not sufficient money provided to build the plant. He might not let the latter item balk the project, for politicians proceed with many things without ample funds at hand, hoping to wheedle from congress that which is lacking. Mr. Daniels might stand ready to do that, although such a procedure seems inconceivable.

It appears strikingly inept also that Mr. Daniels would at this time of national stress dissipate the energies of the naval personnel by taking up plans for the building of such a foolish and worse than useless project such as a government armor plant. The nation is in great need of all the best energies of its arms which have to do with its military defense.

These elements enter so prominently into the entire situation that it is certain the armor plant will not, because it cannot, be built in the near future. In the meantime, the skeptics will continue to disbelieve that the plant ever will be erected.

Technical Progress Not Stayed

NEITHER high prices nor the actual shortage of steel they represent, have yet served to check the flow of steel products into new uses and new channels of distribution. The field for steel specialties is growing in an ever widening circle. As an illustration of this tendency, the plans of a company recently organized in Massillon, Ohio, to manufacture cold-rolled and formed steel products are interesting. The engineers of this company have designed a new type of floor beam for light building construction which, it is hoped, will extend the demand for steel another step into domains heretofore exclusively in the possession of the lumber interests.

The new beam will weigh only four pounds per foot. It will be suitable, therefore, for floors and other purposes in the construction of buildings, and in these cases will have the advantage of being fire-resisting. It is also expected it will find application in the wooden ship-building industry, particularly for deck beams when it is desirable to stiffen the hull structure.

Incidents of this character lend weight to the hope that the heavy hand of war will not stay the technical progress of the American iron and steel industry in peaceful directions.

Sizing Up the Future

ILLUSTRATIONS of the failure of both men and nations to comprehend the full significance or importance of the stupendous world events of the past two years at the time of their occurrence have been frequent. These cases have dealt with military, governmental and commercial movements of both a national and international character. They have resulted in incalculable losses in man power, treasure and prestige before their true import has been grasped and proper methods adopted to meet them.

A world wide movement of tremendous extent and possibilities has been going forward in the steel industry, with the war as the great driving force. Capacity has been added swiftly and at a virtually unprecedented rate, with few exceptions, in every producing country, under the compulsion of military necessity. This impetus toward expansion has been greatly intensified not only by the unprecedented magnitude of the conflict, but by the fortunes of battle whereby Germany early possessed herself of a large fraction of the steel resources of France and Belgium and forced new construction to replace this loss. How large this gain in possible steel output of the world has been, or will be by Jan. 1, 1918, is set forth in the unusually interesting and studious discussion of after-the-war trade conditions, by Samuel A. Benner, which appears in this issue. A 100,000,000-ton steel world is near at hand. The author has treated his subject exhaustively and from angles not ordinarily considered. In doing so, he has drawn on a fund of personal knowledge regarding the foreign steel industry and of long experience in the merchandising of mill products in the international markets.

No question before the American steel producer today is more important or vital than that concerning the marketing of his product after peace has been attained and something like a normal trade situation

THE OPEN HEARTH

has been restored. In Mr. Benner's article there is to be found a strong appeal to the deepest thought and a challenge to constructive preparation for a new order of conditions that must be faced in a little while. A well needed note of warning is injected into the present complacency of the steel industry which has been engendered by months of surpassing prosperity.

Will Iron Go Above Fifty Dollars?

PROGNOSTICATORS who have talked about fifty-dollar pig iron for a year or longer likely will see their prediction fulfilled in 30 or 60 days. Bessemer and basic grades are being quoted generally at $45 and $40, respectively, in the Mahoning and Shenango valleys. If these irons continue to advance in price at the rate maintained since April 1, they will touch the $50 mark before May 1.

Bessemer has doubled in price in the last 12 months, climbing from $21 to $42, valley. Basic in the same period has had an even more spectacular advance, jumping from $19 to $40, valley. In the last 24 months, bessemer has advanced $28.40, and basic, $27.50 a ton, according to minimum prices published by *The Iron Trade Review*.

Constantly increasing costs of labor, iron ores, coke and limestone presage further advances in the prices of this metal. Although $75 iron may enter into the manufacture of finished steel commodities before the end of the war, it is believed influential producers will attempt to hold the market at about $50, valley, for bessemer, until general trade conditions warrant the adoption of quotations above that figure.

How to Keep Molding Machines Busy

TO REALIZE the utmost from the introduction of machine molding in foundries, it is necessary to have every department in the shop properly co-ordinated so that the increased production possible through the use of machines will not be dissipated. This is a point that superintendents and foremen sometimes overlook, with the result that the machines fail to do what was expected of them. In such cases the machines are blamed when the fault lies in the organization of the shop. It is not sufficient to simply set the machine beside a sand heap and expect the output to be doubled. The machine must be supplemented by suitable auxiliary apparatus which will enable it to be operated continuously at the limit of its capacity. Frequently it is discovered after molding machines have been introduced in a shop that the sand-handling facilities are unequal to the new situation. In some cases, the cleaning room may be insufficiently equipped, or some other department may be undermanned. A Wisconsin manufacturer of agricultural implements found he was not getting proper results from his molding machines because the men could not pour off the maximum machine production by hand. This foundryman solved the problem by inventing a device which relieves the molders of the labor of pouring. As a consequence, the machine output increased 20 per cent. Other foundrymen have increased their output of plate work by fitting their machines with aluminum match plates. In each case of this sort, the purpose of the auxiliary apparatus is to keep the work of every other department in step with the molding room, so that the machines can turn out their maximum production. Idle molding machines are a liability, not an asset.

We Shall Need Our Brains

THE old world had been at war for some months before it discovered that an alarming proportion of its best technical brain-power had been destroyed in the trenches.

Highly educated and highly intelligent engineers and chemists, who would have been much more useful behind the fighting line than on it, were killed or disabled and brain-power dissipated. This mistake was corrected by practically all the nations at war. Technical experts were sent to the laboratories, mills and shops behind the fighters.

Thanks to the old world's experience, dreadful as it has been, the new world, when it goes to war, need not blunder so grievously. Motivated by the council of national defense, a census is being taken among some 25,000 engineers and chemists to determine how they can be used to best advantage, mainly in the manufacture of munitions.

Even though we are plunged deeply into the world war, we are a very fortunate people. We should profit, and greatly, from 32 months of the most extensive and also the most intensive warfare that history has so far recorded.

Secretary Baker has opined "that employers of labor make only temporary arrangements with their employes until such time when it is hoped some uniform system can be suggested which will adequately take care of the situation." The council of national defense, according to the secretary of war, has not had an opportunity to consider this matter, but he admits that it is important and hopes to see a committee organized to handle the situation. The Mexican crisis saw this problem developed; in the emergency, employers were loyal, many paying full wages in addition to the army's compensation. How long will the manufacturer be punished for his loyalty by the lethargy at Washington?

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products April 18, average for March, 1917, average for January, 1917, and average for April, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Apr. 18, 1917.	Average prices Mar., 1917.	Jan., 1917.	April, 1916.
Bessemer pig iron, Pittsburgh..	$42.95	$37.45	$35.95	$21.95
Basic pig iron, Pittsburgh.....	40.95	32.85	30.95	19.20
No. 2 Fdy. pig iron, Pittsburgh	40.95	36.55	31.95	19.45
No. 2, Fdy. pig iron, Chicago..	39.00	35.70	30.00	19.00
Lake Superior Charcoal, Chicago	41.50	37.55	33.75	19.75
Malleable, Chicago	39.00	35.80	30.11	19.50
Southern No. 2, Birmingham...	35.00	28.00	23.00	15.00
Southern Ohio No. 2, Ironton.	38.00	36.00	30.00	18.50
Basic, eastern Pa.....	39.00	34.50	30.50	20.50
No. 2X Virginia, furnace.....	38.00	34.00	26.50	18.00
No. 2X foundry, Philadelphia...	41.75	37.25	30.50	20.75
Ferro mang., delivered.....	400.00	275.00	175.00*	175.00*
Bessemer billets, Pittsburgh....	75.00	67.00	60.00	45.00
Bessemer sheet bars, Pittsburgh	75.00	67.00	60.00	45.00
Open hearth sheet bars, Pitts..	75.00	67.00	60.00	45.00
Open hearth billets, Pittsburgh	75.00	67.00	60.00	45.00
Steel bars, Pittsburgh.....	3.35	3.21	2.975	2.50
Steel bars, Chicago.....	3.54	3.40	3.19	2.63
Iron bars, Philadelphia.....	3.659	3.509	3.159	2.559
Iron bars, Cleveland, local del'y.	3.50	3.00	3.00	2.40

*Seaboard.

	Prices Apr. 18, 1917.	Average prices Mar., 1917.	Jan., 1917.	April, 1916.
Iron bars, Chicago mill.....	$3.25	$3.00	$3.00	$2.35
Beams, Chicago	3.79	3.65	3.19	2.62
Beams, Pittsburgh	3.60	3.46	3.075	2.50
Beams, Philadelphia	4.159	3.759	3.509	2.659
Tank plates, Pittsburgh.....	4.50	4.20	3.575	2.67
Tank plates, Chicago.....	4.69	4.59	3.89	2.94
Tank plates, Philadelphia.....	7.159	5.659	4.909	3.809
Sheets, blk., No. 28, Pittsburgh	5.50	5.05	4.56	2.90
Sheets, blue anld., No. 10, Pitts.	5.50	4.70	4.125	3.00
Sheets, galv., No. 28, Pittsburgh	7.50	6.72	6.56	4.89
Wire nails, Pittsburgh.....	3.40	3.16	3.00	2.40
Connellsville fur. coke, contr...	7.00	7.60	7.25	2.40
Connellsville fdy. coke, contr...	8.00	6.90	6.375	3.50
Heavy melting steel, Pittsburgh	28.00	23.40	23.25	18.12
Heavy melting steel, eastern Pa.	25.50	23.75	26.50	17.75
Heavy melting steel, Chicago..	27.25	23.00	20.25	16.75
No. 1 wrought eastern Pa.....	36.00	30.50	26.50	23.00
No. 1 wrought, Chicago.....	30.50	24.00	23.75	16.80
Rerolling rails, Chicago.....	33.00	27.25	27.25	17.90
Car wheels, Chicago.....	24.50	20.31	19.75	14.00

(For Additional Prices See Page 904.)

Lively Buying Boosts Iron Prices

Steady Demand for Remainder of the Year and for First Half of 1918 Sustains Upward Movement of Quotations—Basic Readily Commands $40, Valley—Buffalo Iron Touches $45—Some Round Lots Closed in All Districts

Philadelphia, April 16.—Brisk buying, comprising mostly small tonnages, but punctuated by several large blocks, featured the pig iron market in this district during the week. The Bethlehem Steel Co. took 11,700 tons of bessemer from an eastern furnace, for delivery at Steelton beginning May 1 at the rate of 1,300 tons monthly. The price is understood to have been close to $40, furnace, or $41.50 to $42, delivered. Other quotations ranged from $43 to $44, delivered. A New York state melter inquiring for 4,000 tons of No. 1X for first half delivery, placed this tonnage within western New York at $37, delivered, or $36.50, furnace. An eastern Pennsylvania maker of copper bearing low phosphorus sold 2,000 tons for last half to a Buffalo district consumer at slightly over $72.75, furnace. A nearby consumer purchased a large block of basic for last half. The John A. Roebling's Sons Co., Trenton, N. J., has not yet closed for the 5,000 tons of basic for first half for which it recently inquired. This company also has been inquiring for an indefinite tonnage of low phosphorus for the same delivery. A consumer here has purchased a tonnage of malleable from an Ohio maker at $41, furnace, or $43.78, delivered, for last half. Prices on foundry iron continue to move upward but show considerable variation. One eastern Pennsylvania furnace has quoted $43, furnace, for No. 2X for this year at which it has sold a moderate tonnage. This interest, however, offers to take on regular customers at $42, minimum, for this or next year. The highest it has done for first half so far is $41, furnace, for 2X. Two other eastern Pennsylvania furnaces have a minimum of $42, furnace, for this year and are not quoting for next year. An eastern Pennsylvania furnace quoted $45 on several tonnages for fourth quarter only. Another eastern Pennsylvania furnace is taking small tonnages at $41, furnace, both for this and next year. Other eastern Pennsylvania makers, although apparently not going below $41, furnace, for this year, occasionally are doing the old prices on first half. During the week one good sized block for first half went at $36, furnace, and another at close to $35, furnace. The minimum on Virginia for this year now appears to be $40, or $42.75, Philadelphia, at which 750 tons of No. 2X and smaller have been sold. Late last week at least one furnace was booking small lots for this year at $38, furnace. One Virginia furnace has sold a small lot of high silicon at $45, furnace. The leading Virginia maker has advanced its first half prices to the following level, effective April 14: No. 2X, 35, furnace; No. 1X, $35.50; No. 2 plain, $34.75; gray forge, $34. No. 2 southern has been sold at $35, Birmingham, for shipment this year into this district. A moderate tonnage of Kentucky No. 2 plain for this year was sold here at $36.75, furnace. A resale lot of 10,000 to 20,000 tons of basic for the last half was offered at $37.50, delivered Philadelphia. A valley furnace refused to book a fair tonnage of basic for shipment this year to this district at $39.50, furnace. Several thousand tons of resale bessemer now at tidewater have been offered at $40.25 and later at $42, f. o. b. shipping point. Standard low phosphorus is from $76 to $78, Philadelphia, for any shipment.

(*For complete prices see page* 904)

Prices March Toward $50

Pittsburgh, April 17.—Pig iron prices in the valleys continue to rise. Bessemer and basic are well pegged at $42 and $40, respectively, and foundry and mal-

leable grades are commanding as high as $41 for this year. A price of $50 for bessemer before the end of the month is expected. The United Alloys Steel Corporation, Canton, O., which entered the market when basic was selling at $35, has increased its purchases by about 20,000 tons additional, for delivery this year, making the total taken during the past two months about 30,000 tons. Part of the latest purchase was at $40, valley. The Canadian Steel Foundries is credited with having taken from 5,000 to 10,000 tons of basic at the current price. A steel works interest in the St. Louis district has asked for 1,500 to 2,000 tons of prompt basic. Several inquiries for bessemer, involving from 1,000 to 5,000 tons, are pending. A 2,000-ton lot of foundry iron has been sold at $40 for delivery this year. The Carnegie Steel Co. is blowing 51 of its 59 blast furnaces and will apply the torch to several additional stacks this month if coke is available.

1918 Prices Steadily Rising

Cleveland, April 17.—A valley furnace has sold 3,000 tons of basic to an eastern consumer for delivery beginning July, at $40, furnace. The same buyer is seeking 7,000 tons additional. Most Buffalo furnaces, according to information received here, are asking $45, one maker having definitely set that minimum this week. A sale of No. 1 foundry for Buffalo delivery brought $45 this week. A western Pennsylvania consumer took some No. 2 foundry at $40, furnace, this week, but another producer is still quoting $37. Various sales have been made at $38, furnace. Next year's inquiry is good. An automobile castings company with several plants in northern Ohio and elsewhere bought 12,000 tons of foundry grades, 7,000 tons of northern and 5,000 tons of southern, the latter at about $39 to $40, delivered, for No. 2. The spread between quotation for 1917 and 1918 delivery is decreasing. One maker is asking $40, furnace, for No. 2 foundry for either last half or first half of 1918 delivery, although $39 might be taken on next year's iron. With next year's ore prices uncertain, some producers hesitate to take second quarter of 1918 business at any figure below 1917 quotations. Alabama is being offered here at $35 for this year and at $33, for next, or from $37 to 39, Cleveland.

Heavy Business at New York

New York, April 17.—Pig iron buying in this district continues well sustained and a large tonnage was placed or inquired for during the week. A New England consumer placed about 6,000 tons of basic for last quarter delivery; a New York state consumer just has inquired for 5,000 to 10,000 tons of basic for last half bought partially; a New Jersey consumer closed with eastern Pennsylvania makers for 1,200 tons of prompt foundry and 2,500 tons for the last half; another New Jersey interest bought 1,000 tons of foundry for first half; a Bridgeport consumer closed 1,000 tons largely Virginia for this year at $40, furnace, or $43.25, delivered, and a large eastern consumer wants 15,000 tons of special iron for this year. The American Locomotive Co. inquiry for 3,350 tons of foundry and low phosphorus for Montreal remains open. The Utah Copper Co. wants 1,150 tons of No. 1 foundry for western delivery. A New York state consumer continues out for 1,000 tons of foundry for first half. New export inquiries are heavy, including 5,000 tons of basic for Japan; 3,000 tons of hematite for Italy; two lots of 5,000 to 10,000 tons each of foundry to Scandinavian countries; 3,000 to 5,000 tons of No. 3 foundry for Cuba. Two thousand tons of foundry, for Japan; 2,000 tons of low phosphorus, for Canada; lots of 3,500 tons of low phosphorus and 4,000 to 5,000 tons of foundry for Italy, and 1,000 tons of foundry for South America. Japan bought this week 5,000 to 6,000 tons of basic for third quarter. Difficulty in securing cargo space blocks export business. Merchant sellers have difficulty in getting iron to market. Prices still advance. The leading Virginia maker after advancing April 13 to $35, furnace, for No. 2X for next year, today withdrew from the market entirely. The minimum price on eastern Pennsylvania furnace is $41, furnace, for No. 2X for this year with sales at as high as $43, on small tonnages. One furnace which last week was selling first half No. 2X at $36 to $37, furnace, now is quoting $40 for that period. Basic is at $38 to $40, delivered, and probably is nearer the outside than the inside figure.

(For complete prices see page 904)

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Southern Iron Advances

Cincinnati, April 16.—Southern iron for the first half of next year has advanced from $1 to $3 a ton. No. 2 foundry is now held from $33 to $35, Birmingham basis, for that delivery, and is unchanged at $35 for the second quarter and last half of this year. The Virginia Iron, Coal & Coke Co. is out of the market entirely for 1917 shipment, and is holding No. 2X at $35, furnace, for the first half of 1918. Southern Ohio No. 2 foundry is unchanged at $40, Ironton basis, for 1917 shipment, and $38, Ironton basis, for the first half of next year, including brands from the Ironton district and Hamilton Very little iron is to be had for this year's shipment except from the Hamilton, O., stack, which will be blown in shortly. Southern Ohio silvery iron is quoted at $46, furnace, for 8 per cent silicon, for delivery over the remainder of this year and the first half of 1918. The market is more active than for several weeks. Buying is being done mostly without inquiry and for the first half of next year. Hamilton, O., foundries have taken about 5,000 tons of northern iron and 2,000 tons of southern grades during the past few days for the first six months of 1918. An inquiry is out for 3,500 tons of either northern or southern foundry iron from a northern Ohio user, including 500 for the second quarter, 500 for the last half of this year and 2,500 tons for the first half of 1918.

War Strengthens Market

St. Louis, April 14.—A strong general demand for pig iron prevails and prices still are advancing. Dealers and consumers place a bullish construction on the war. Some of the latter are hastening to buy in anticipation that the government may come into the market. All foundries in this district are working at capacity, and turning down business. The car situation remains a drag on the market. No. 2 southern pig iron is quoted nominally between $36 and $40, delivered.

Resume Next Year's Sales

Birmingham, April 17.—Inquiries for a large quantity of iron are current in this territory and sales again are noted for delivery over the first half of 1918; in fact, this year's iron is considered practically the same as spot iron. Immediately after the declaration of war by the United States against Germany a little lull was felt.

Though there is no lack of orders on hand, one of the smaller companies decided to try out the situation. A little tonnage was offered at $32.50 per ton, No. 2X, but was taken promptly and the price soon was withdrawn. This company withdrew from the market except on a very promising offer. Spot iron is on a $35 level with $33 as the minimum for next year. Charcoal iron has gone to $38 to $40 with little demand. The make in this line is not very large. Basic iron is moving actively. Railroad cars are a little more plentiful in this section, and removal of embargoes is reported in other directions, so that general deliveries are better. Material increase in iron production in Alabama in the next 90 days is assured. The Little Belle furnace of the Tennessee Coal, Iron & Railroad Co. at Bessemer, Ala., is being remodeled to make special iron; the Eagle furnace at Attalla, Ala., taken over by Gulf States Steel Co., will be blown in in the next two weeks; City furnace No. 1 of the Sloss-Sheffield Steel & Iron Co., now being relined, will resume within six to eight weeks; the Rome, Ga., furnace will be running within two weeks; the Ironaton, Ala., furnace No. 2, of the Alabama Co., is being relined and when it is blown in the second furnace will go out for repairs; the Shelby furnace No. 2, of Shelby Iron Co., to be repaired and put on foundry iron. Steel mill operations in the south are very active. Cast iron pipe companies are melting much iron on old orders, but new business not so plentiful. Foundries and machine shops have considerable work in hand.

All Chicago Iron Strong

Chicago, April 17.—Great strength marks every grade of pig iron made in or entering this district. Northern No. 2 foundry and malleable are quoted by local makers at $39 to $40, furnace. Considerable tonnage has been sold at the maximum and the lower quotation probably will disappear shortly. Inquiry is large. Demand for first half of 1918 is heavy. Considerable sales have been made for this delivery at $35, furnace. A Michigan motor manufacturer recently closed with a Virginia furnace for about 4,500 tons. Lake Superior charcoal iron has no regular schedule, but quotations on recent inquiries indicate a range of about $41.75 to $43.75, delivered Chicago. On an inquiry for 100 tons of 3 per cent silicon $46.75, delivered Chicago, was quoted. The situation as to southern iron is somewhat mixed. For spot, sales of consignment iron have been made at $36, Birmingham. One interest with a small tonnage unsold for last half is quoting $42.50, delivered Chicago, on No. 2X. For last half and first half of 1918, no general price is quoted, but one interest has indicated $38.50, delivered Chicago, could be done for first half. Jackson county silveries are practically unobtainable and the nominal quotation is about $48, furnace, for 8 per cent. A Tennessee stack with a few hundred tons yet to be sold has gone on the same basis as Jackson county, $48, furnace, for 8 per cent.

Restrict Imports of Ferro

English Makers Offer Only To Consumers Filling Ally Needs—Spot Metal Brings $400 to $425

New York, April 17.—Cable advices just received are to the effect that the British ministry of munitions has refused to grant any further licenses for exporting ferro-manganese for use in this country by consumers not making steel for the allies. These advices say nothing about licenses for the requirements of concerns engaged on allied contracts. They appear to foreshadow however further restriction in the movement of English ferro-manganese to this country.

The arrival of a cargo of several thousand tons of 80 per cent English ferro-manganese at Baltimore last week resulted in slightly larger offerings and prompt carloads have been sold at $400 and $425, seaboard. One holder is asking $500 on prompt English, while another wants $480 on a carload of prompt domestic. Several consumers are inquiring for their future requirements, but have been unable to obtain quotations. Representatives of the English producers are unable to offer material and eastern sellers of domestic are not quoting because they have sold as far ahead as they are covered on ore. During the week the government bought 50 tons of spot from a Philadelphia seller and is understood to have done less than $395.

Interest is shown in the spiegeleisen market by the closing of a consumer in the Pittsburgh district for 5,000 tons, of which 2,000 went to one maker and 3,000 to another, all at slightly less than $75, delivered. The market now is strong at $75, furnace. One Pennsylvania maker which was asking considerably less on fourth quarter, now practically is sold up for the year and is asking the $75 figure. The volume of pending inquiry continues fairly large. Two middle western consumers are in the market for 1,500 to 2,000 tons each for this year. Inquiries for a total of about 2,000 tons for next year, have been received but makers have not quoted.

Fifty per cent ferro-silicon continues devoid of spot and nearby offerings. The earliest deliveries to be had are in June and July, which are around $225, delivered, although June in one case has sold at higher. A small sale of 12 per cent bessemer ferro-silicon for shipment into this district, was made at $55, furnace.

Indian Ore Wanted

Philadelphia, April 16.—Offers of 80 cents and 83 cents a unit at seaboard have been made for Indian manganese ore by consumers. No business has resulted, however, since these offers have had to be declined due to the lack of vessels.

Alloys Go to Higher Levels

Pittsburgh, April 17.—Spectacular advances feature the market for 80 per cent ferro-manganese. Dealers are talking of the possibility of $500 ferro-manganese. So far as can be learned, no large tonnages of this alloy have been sold in the open market recently. For the third time in less than 60 days, manufacturers of lower grades of bessemer ferro-silicon have marked up prices. Eleven per cent is quoted at $62.50, a $5 advance. The recent purchase of 5,000 tons of spiegeleisen by a western Pennsylvania steel works was at about $75, delivered. This metal is quoted as high as $80, furnace.

Quote Carload at $500

Cleveland, April 17.—A price of $500, seaboard, was quoted to a buyer in this district this week on a carload of ferro-manganese for early delivery. Practically no early metal of this kind is being offered.

Chicago Ferro Advances

Chicago, April 17.—Ferro-manganese from a local producers' stack is now quoted at $350 for any delivery during the present year. This quotation replaces a former spread which represents deferred delivery at a lower rate than for prompt material. Demand is strong and the furnace has comparatively small tonnage remaining.

The Parish Mfg. Co., Reading, Pa., maker of frames for automobiles, has granted a voluntary advance of 10 per cent in the wages of its employes.

(*For complete prices see page* 904)

Ask Rounds for Munitions

Tentative Tonnages in Market Are Large—Canadian Mills Sell 1918 Shell Steel to Allies

Pittsburgh, April 17.—Tentative inquiries for steel rounds for the manufacture of shrapnel involve heavy tonnages in the aggregate. The United States is an active factor in the market and entente nations again are negotiating for shells in this country. Steel bars are being held at 3.35c for contract delivery. Makers of bar iron have advanced prices $5 to $10 a ton to about 3.75c for common stock. Demand for iron bars is described as heavy.

Specifications Are Rushed

Philadelphia, April 16.—The steel bar market in this district continues to be featured by a rush of specifications and also by an active new demand. Mills are chary about taking on any additional tonnages, due both to their sold-up condition and to a desire to wait and see what the government will require. One eastern Pennsylvania mill now is quoting 4c, Pittsburgh, as a minimum. Another independent maker asks 3.75c, Pittsburgh, minimum and is doing 4c or higher on miscellaneous lots. Refined iron bars remain at 3.50c, Pittsburgh, or 3.659c, Philadelphia.

Steel Bars Uncertain

Chicago, April 17.—Demand for steel bars continues strong but the spirit of uncertainty cast over the market by the imminence of government buying, is a strong factor. The nominal quotation remains 3.54c, Chicago mill, for delivery at convenience and premiums are paid for better delivery. The latter is increasingly difficult. Hard steel bars still are quoted at 3.25c, Chicago mill, but sales of small sections for immediate delivery have been made as high as 3.40c, Chicago. With rerolling rails increasing in cost this figure probably will be passed shortly.

Chicago Bar Iron Steady

Chicago, April 17.—Strength continues in the market for bar iron and new inquiry is constant, largely from consumers who are not regular bar iron users. Most manufacturers are not anxious to take further tonnage and strong representations usually are necessary on the part of the buyer. The quotation is 3.25c, Chicago mill, with a tendency higher.

Nuts and Bolts Much Higher

Pittsburgh, April 16.—Recent advances in prices of bar stock led makers of nuts and bolts to put up quotations 5 to 15 per cent, April 12. This is the first change in prices since the adoption of the 3c quotation on steel bars. Rivets were advanced $10 a ton immediately after bars were marked up $7 a ton to 3.35c. Ship builders are urging nut, bolt and rivet makers to meet specifications, and premium prices frequently are being paid for prompt delivery. Manufacturers are giving preference to consumers filling contracts for the government.

Hoops May Be Affected

Pittsburgh, April 17.—Should the government decide to take any action towards restricting the distilling industry under present war conditions, the hoop market will be affected considerably. Specifications for hoops and bands continue heavy. Most manufacturers are quoting only upon application. None of the mills in this district is in a position to meet specifications for delivery before the latter part of the third quarter. Prevailing prices for contract shipment are nominal.

Chain Held at 7c

Pittsburgh, April 17.—Government officials are negotiating with chain manufacturers for heavy tonnages. Chain is well pegged at 7c for ⅜-inch proof coil. It is not unlikely that prices will be advanced $5 or $10 a ton at an early date.

Institute Calls Meeting

The annual meeting of the American Iron and Steel Institute has been called for Monday, May 7, at 12 o'clock, at the headquarters of the organization, 61 Broadway, New York City, for the purpose of electing directors and transacting other business.

The strike of iron molders at three plants in Fitchburgh, Mass., has been settled and the men have returned to work. The men asked for a minimum wage of $4 per day, which they were guaranteed.

The Smith & Winchester Mfg. Co., South Windham, Conn., maker of paper mill machinery, has taken out a group form of life insurance for its employes, which will provide a full year's wage to the family of any employe who may die while in the company's service. The yearly wage is defined as 52 times the man's last weekly pay envelope.

(For complete prices see page 904)

General Advances

Shown in Warehouse Prices—Plates are Leader

Cleveland, April 17.—Another general advance in warehouse prices is announced. Leading jobbers are now holding steel bars at 4.50c; structural steel at 4.75c; plates at 6c; hoops at 6c; No. 10 blue annealed sheets at 6c to 6.25c. Another interest is holding No. 28 galvanized at 8.25c, and black at 6.50c. Sheets are very scarce, owing to the sheet bar shortages. Warehouse demand is good.

Boosted at Cincinnati

Cincinnati, April 16.—Warehouse prices on plates have been advanced $10 per ton to 6c, and No. 10 blue annealed sheets are up $5 per ton to 5.75c. Other warehouse prices are unchanged. Cold rolled bars are given at 10c plus the last price, hot rolled steel bars from 4.35c to 4.45c, and shapes at 4.60c, Cincinnati warehouse. Black sheets No. 28 gage are at 5.65c, Cincinnati.

Detroit Moves Higher

Detroit, April 17.—An advance of $10 a ton has been made in plates from warehouse and the new price is 6c. No. 28 black sheets have been raised from 5.75c to 6.40c, and No. 28 galvanized sheets, from 8c to 8.50c.

Stores Near Depletion

Chicago, April 17.—Demand for steel products from store is unusually strong in view of the practical impossibility of obtaining material from mills. Assortments are badly broken and many lines are near depletion. Difficulties in obtaining material from mill are almost as bad for warehouses as for other buyers. No. 10 gage blue annealed are now quoted at 5.75c, Chicago store, and No. 28 black sheets at 6.25c, Chicago store. These figures are somewhat lower than present mill prices on the same material.

Dr. Richard C. Maclaurin, president of the Massachusetts Institute of Technology; Dr. Hollis Godfrey, chairman of the council of national defense, Dr. Robert A. Millikin, vice chairman of the national research council; and Frank A. Scott, chairman of the general munitions board, will speak at the annual meeting of the Technology clubs, Massachusetts Institute of Technology, Cleveland, April 19, 20 and 21.

March Lettings Show Gain

Increase to 68 Per Cent on 122,500 Tons—Government Wants Big Tonnage of Fabricated

New York, April 17.—A better record for fabricated steel contracts was shown by March lettings amounted to 68 per cent of the entire capacity of the bridge and structural shops of the country or approximately 122,500 tons. The statistics are compiled from the Bridge Builders and Structural Society's records.

Demand for plain structural shapes now comprises mostly small tonnages and the market is quiet. The mills continue to quote 4c to 4.25c, Pittsburgh, or 4.169c to 4.149c, New York, the outside price applying to preferred deliveries. Two leading Pennsylvania makers temporarily have given up the rolling of structural shapes and now are engaged entirely in making ship shapes.

Demand in East Heavy

Philadelphia, April 17. — Call for shapes continues heavy. Most of it is in small tonnages but a good many lots involve 500 tons or more. New business is difficult to place owing to the sold-up condition of the mills. One maker which is sold up for the rest of the year and whose last price level was 4c to 4.25c, Pittsburgh, or 4.159c to 4.409c, Philadelphia, no longer is quoting. Another eastern Pennsylvania maker has a minimum of 4.25c but generally is naming 4.50c, Pittsburgh.

Government Buys Material

Pittsburgh, April 17.—Fabricators are being called upon by the government for heavy tonnages. It is estimated that pending inquiries for structural material for machine shops, crane runways and aeroplant hangars involve 63,000 tons. The McClintic-Marshall Co. has been awarded 5,000 tons for a crane runway at the Norfolk navy yards. Shapes are being held at 3.60c for future delivery.

Cleveland, April 17. — Sizable tonnages of structural shapes for fairly early delivery have been made in this territory at 3.75c, Pittsburgh. Buyers are showing no hesitancy in paying this price where they can get deliveries. Sellers report a surprising amount of tonnage if they can meet this requirement. Eastern mills are quoting 4c mill minimum to this territory for delivery at convenience. New fabricated work continues largely of industrial character. Plans are being drawn for the new city auditorium, estimated it requires 4,000 tons and bids are expected to be asked this summer. A Chicago railroad viaduct will require 4,000 tons.

Structural Buying Light

Chicago, April 17.—Structural buying in the west is confined mostly to small requirements for steel as a minor need in brick and concrete buildings. Practically nothing of a commanding size is pending and the largest sale for a single project in the past week involves 1,228 tons for bridges over the sanitary canal at Chicago, taken by the Strobel Steel Construction Co. The nominal quotation is 3.79c, Chicago, for plain material for remote delivery.

CONTRACTS AWARDED.

Addition to plant of Carpenter Steel Co., Reading, Pa., 350 tons, to L. F. Shoemaker & Co.

Power station for New Bedford Gas & Electric Co., New Bedford, Mass., 280 tons, to New England Structural Co.

Addition to boiler house of American Gas & Electric Co., 265 tons, to Belmont Iron Works.

Government gun shop, Washington, 4,150 tons, J. Henry Miller low on general contract and steel reported will go to American Bridge Company.

Building for Passaic Cotton Mills, New Bedford, Mass., 950 tons, to Bethlehem Steel Bridge Corporation.

Power station for Edison Co., Boston, 600 tons, to New England Structural Co.

Power house extension for Utica Gas & Electric Co., Utica, 375 tons, to Ferguson Steel & Iron Co.

Three grade crossings for the New York Central railroad, 1,200 tons, divided between L. F. Shoemaker & Co. and McClintic-Marshall Co.

Railway girder bridges for Calumet Sag Channel at Blue Island, Ill., for Sanitary District of Chicago, 1,228 tons, to Strobel Steel Construction Co.

Boiler House for Studebaker Corporation, South Bend, Ind., 635 tons.

Ore tower for Aluminum Co. of America, Baltimore, Md., 145 tons, to Milwaukee Bridge Co.

Addition to plant of Berger Mfg. Co., Canton, O., 500 to 600 tons to an independent shop.

Masonic building, Akron, O., 500 to 600 tons to an independent shop.

West side exchange for New York Telephone Co., New York, 1,000 tons to Eidlitz & Ross.

Plant in Cuba for Hershey Chocolate Co., 1,200 tons, to Virginia Bridge & Iron Co.

Department store building at Pittsburgh for Frank & Seder, 1,500 tons, to the McClintic-Marshall Co.

Crane runway for United States navy yards at Norfolk, Va., 5,000 tons, to the McClintic-Marshall Co.

The plant of the Studebaker Corporation, South Bend, Ind., 500 tons general contract to Whitehead & Kales, Detroit; Bethlehem Steel Corporation to furnish part of plain material.

CONTRACTS PENDING.

Addition to the plant of Hinde & Dauch, Sandusky, O., 600 tons of structural steel and 400 tons of reinforcing bars; Albert Allen, Cleveland engineer.

Piers at Halifax, N. S., for Dominion government harbor commission, 3,000 tons, bids in.

Pier shed at Quebec for Dominion government, 1,500 tons, bids in.

Office building at 130 William street, New York, 900 tons, bids again being taken.

Terminal Richmond, Va., 700 tons, to Virginia Bridge & Iron Co.

Viaduct for Springfield, Mass., 3,000 tons, preliminary bids asked.

Office building at 134 William street, 825 tons, bids asked.

Ten bridges for Pennsylvania railroad, 800 tons, bids being asked.

Plant of Union Smelting & Refining Co., Newark, N. J., 500 tons, bids being asked.

Ten additional hangars for government, 350 tons, bids being asked.

Freight station for Central of Georgia railroad, 170 tons, bids being asked.

New York Telephone building, Elizabeth, N. J., 250 tons, bids being asked.

Viaduct for Chicago Union Station, 3,000 tons, bids being taken.

Additions to plant of Grant Motor Co., Cleveland, 1,000 tons shapes and 1,000 tons reinforcing bars. Bids being taken.

(*For complete prices see page* 904)

Wharton Steel Co. blew in its No. 1 furnace at Wharton, N. J., April 12. Its output will be standard bessemer iron at the rate of 150 to 160 tons a day. No. 2 furnace will go in about May 1, and No. 3 late in June.

Sheet Bars Rise

With $80 for Third Quarter Delivery Steel Market Waiting

Youngstown, O., April 17.—Valley sheet bars are on a flat basis of $80 for third quarter. The leading maker has entered the market as a seller to its regular customers and quotes that figure as its minimum. This manufacturer is the only one in this territory who has any bars for sale. No bars for later than third quarter delivery are known to be obtainable and the third quarter tonnage is limited. Traffic congestion and car shortage continue to handicap production of semi-finished, as well as all other material; scarcely more than 80 per cent of capacity is in operation.

Buy Canadian Shell Steel

New York, April 17.—Shell steel for 1918 delivery is being bought by the imperial munitions board of Canada, according to information received here. The board has contracted with the Dominion Steel Corporation for its entire shell steel output for the first half of next year. This action may foreshadow similar purchases by the entente governments from American mills.

Little Steel to Offer

Philadelphia, April 16.—Although demand for semi-finished steel is heavy in this district, actual business is of small proportions, due to the fact that the makers have practically no steel to sell. One eastern Pennsylvania mill has

sold several stock lots of open hearth rerolling billets, involving around 100 tons each, at $75 to $80 mill. It also has sold several stock lots of forging billets at $90 to $100 mill.

Cold Rolled Moving Upward

Pittsburgh, April 17.—Cold rolled strip steel makers gradually are withdrawing prices below 7.50c, base, although the 7c quotation has not disappeared entirely. Deliveries generally are deferred from four to six months. No demand exists for war purposes. Munition makers, however, likely will call upon strip steel manufacturers for large quantities of cartridge clips and the like.

Sheet Bars Jump

Pittsburgh, April 17.—Sheet bars for nearby delivery have commanded as high as $80 a ton in adjacent territory. Prices below $75, mill, seem to have disappeared. Several lots of sheet bars have been sold at $75 and $78 this week. Specifications from sheet and tin plate makers are extremely heavy. Billets are equally as strong as sheet bars. Forging billets have sold at 5c a pound, or $112 a gross ton. Wire rods are commanding $85, Pittsburgh, and muck bar is held at $60, Pitsburgh.

Sell Sheet Bars Higher

Cleveland, April 17.—Sheet bars are stronger and fair sized sales have been made on the base of $78 to $80, Cleveland mill. The Ford Motor Co. was a buyer of 2,000 tons; another customer took 1,500 tons. Early delivery is promised. Recent sales have been made at $75, Pittsburgh, and this, apparently, represents the present minimum.

Government's Needs Huge

Estimated at Least 500,000 Tons of Rolled Steel Required— Pennsy Buys Tonnage of Car Material

Government Needs Are Huge

Pittsburgh, April 17. — Fully 500,000 tons of steel in various forms, a large part of which is in plates for naval vessel and yard construction, is being negotiated for by the government. Some large contracts for the steel for battle cruisers, destroyers, etc., have been closed with Pittsburgh makers. Pending inquiries for fabricated material involve about 60,000 tons. Contrary to numerous reports heard recently, the Carnegie Steel Co. has made no changes in prices on plates, shapes and bars, which are quoted at 4.50c, 3.60c and 3.35c, respectively, for delivery at the convenience of the maker. The Pennsylvania railroad has awarded the Carnegie company a contract for 20,000 tons of steel for 1,000 steel cars, which will be built at the shops of the Pennsylvania company at Altoona, Pa.

Reject Many Tonnages

Philadelphia, April 17.—Numerous inquiries, involving huge tonnages of plates again have been rejected by the makers during the week. In fact, very little actual business is reported. One leading eastern Pennsylvania mill has ordered its sales offices to accept no lots of consequence involving even a carload or more at any price without first getting special consent. This policy of turning away business is almost universal, due not only to the sold-up condition of the mills, but to the fact that these interests continue to hold themselves at the disposal of the government. One large eastern buyer during the week insisted on buying 10,000 tons of tank plates for specification within the next few months, but after earnest efforts, succeeded in getting only 2,000 tons, which were obtained on the basis of 7.159c, Philadelphia. In general, prices nominally are unchanged. One leading maker quotes as follows on Philadelphia delivery: Tank plates, 7.159c; Lloyd ship plates, 8.659c to 10.159c; ordinary flange plates, 7.309c; Lloyd flange plates, 10.159c; Lloyd fire box plates, 10.209c; marine plates, United States standard, 16.159c to 17.159c. Another eastern Pennsylvania mill, which last week still was taking small tonnages of tank plates at 6.50c, Pittsburgh, now has raised its range to 6.75c to 7c, Pittsburgh, but is booking only a few small tonnages. Approximately 60 per cent of the plate demand here is from ship yards. The remainder comes from car and locomotive builders and from the railroads.

Plate Price Soaring

Chicago, April 17.—Insistent and heavy demand for steel plates is pushing price on prompt delivery material rapidly toward the expected 10 cents per pound, which has been set by some steel makers as a possible goal. Buyers of plates for export have been offering 6.50c to 7c, and sales have been made at the former figure for reasonably prompt delivery. An offer at the higher figure is being considered now on a considerable export tonnage and probably will be accepted. The nominal quotation for remote delivery is 4.69c, Chicago.

(*For complete prices see page* 904)

Ingot Production

Shows Considerable Increase in March Over February

Additional returns received by *The Iron Trade Review* during the past week from independent steel companies give a clearer insight into the rate of steel production maintained during March. The latest records, as given in the accompanying table, show a production of 1,091,493 gross tons of steel by the independent companies whose reports have ben received to date. The same companies in February produced 911,178 gross tons. Reducing these totals to an average daily rate, these companies produced 35,209 gross tons daily in March and only 32,542 gross tons daily in February. The February rate was thus 92.4 per cent of that in March. Thus the increase in output last month over February was 7.6 per cent.

Steel Ingot Output

	January.
Basic open hearth ingots	890,574
Acid open hearth ingots	44,542
Bessemer ingots	202,971
Electric furnace ingots	5,326
Total	1,143,413

	February.
Basic open hearth ingots	786,390
Acid open hearth ingots	38,277
Bessemer ingots	183,351
Electric furnace ingots	4,915
Total	1,012,933

	March.	*Feb.
Basic O. H. ingots	841,673	695,796
Acid open hearth ingots	43,339	38,277
Bessemer ingots	200,487	172,764
Electric furnace ingots	5,994	4,341
Totals	1,091,493	911,178

*All March reports not yet received. This column shows records of same companies which have reported for March.

The supplementary figures also have swelled the totals for January and February. As shown in the table, figures have now been secured from by far the majority of the independent steel companies. January's total is 1,143,413 gross tons, against 1,012,933 gross tons in February. The January daily average rate was 36,884 gross tons, against 36,176 gross tons in February. The latter month thus showed a decline of 1.9 per cent from January. Pig iron production declined 7 per cent in February, but gained 11 per cent in March.

The Hartford Machine Screw Co., Hartford, Conn., has given its 1,400 employes a raise in wages, equal to 10 per cent, affecting both day workers and piece workers. This action was voluntary on the part of the company and will increase the pay roll from $75,000 to $100,000 a year. It already has become effective.

Want 10,000 Tons of Sheets

Large Inquiry in Valley Market Thought to be for Government Consumption—Auto Makers Up Against It

Youngstown, O., April 17.—Although no direct inquiries for sheets have as yet come into the valley from the government, there have appeared in this market several fairly large propositions of such character as to lead to belief that the inquiries have large contracts with the military authorities. One inquiry is for 10,000 tons.

The large producer who for several weeks has held his quotations below the others declares today that he will talk black sheets with no one less than a 7c basis; he quotes his blue annealed at 6.75c and his galvanized at 8.75c to 9c. The leading valley maker quotes from 6c to 7c on bessemer black sheets, but says most of the business is nearer the 7c mark, and that only an exceptional old tonnage of some size in stock, or which would particularly fit into his schedule, could be had for 6c.

Purchasers asking prices on more than 100 tons have little chance of getting even a quotation. Men in the sheet buying game for a good many years have practically as much difficulty as any newcomer, except where they are fortified by a long buying connection with some strong producer.

Opinion is gaining prevalence that the government will not, or at least does not at present intend to fix a set of arbitrary prices on sheets, mainly for the reason that many producers do not control their own sources of semi-finished material and are themselves controlled by the high and increasing prices they must pay for sheet bars, which today, for instance, cannot be bought in the valley, except under contracts of long standing, for less than $80. A leading maker declares that the figure for third quarter delivery—and this concern will not sell beyond—is $80 to all comers, with no offerings to any except regular customers.

Production of black sheets in the valley this week is about 80 per cent of capacity; of galvanized it is about 70 per cent. The car and traffic situation is not improved over conditions of last week and weeks past; and the job of getting raw materials into the mills and shipping out finished product persists a great handicap.

Eastern Demand Strong

Philadelphia, April 16.—Sheets are in great demand here and inquiries put out in the past week totaled a huge tonnage. Very little business has been booked, however, due to a desire on the part of the makers to reserve their capacity for the requirements of the government. Deliveries of sheets are being rushed to the plants which are turning out various products for the navy department. The principal eastern maker has advanced its price on No. 10 gage blue annealed sheets to 6.50c, Pittsburgh, or 6.659c, Philadelphia, applying both to third and fourth quarters.

Contract Sheet Prices Nominal

Pittsburgh, April 17.—Several manufacturers of steel sheets in western Pennsylvania have scarcely any additional tonnage to offer for delivery this year, having disposed of fully 90 per cent of their output for the second half in less than two weeks after books were opened for shipment. For delivery in 30 to 90 days, galvanized sheets are selling at as high as 9c, black, 7.50c, and blue annealed, 7c, base. The American Sheet & Tin Plate Co. has made no changes in its prices since books were opened April 2 for shipment after July 1, at 5c for blue annealed, 5.50c for black and 7c for galvanized. Tremendous demand exists for shipment to concerns supplying munitions to the government.

Automobile Stock Scarce

Automobile makers will be unable to turn out as many cars as they desire this year, on account of inability to obtain steel sheets and other steel products. Several days ago, an automobile manufacturer paid 7.50c, base, for 1,000 tons of special stock for delivery in May and June, being willing to offer a handsome premium in order to obtain desired deliveries. Generally, automobile concerns are not receiving more than 50 per cent of the material necessary to complete their contracts. This also is true of makers of electrical equipment, although electrical sheets apparently are not as scarce as automobile stock.

Sheet Price Continues to Rise

Chicago, April 17.—Although prices on steel sheets have been advanced steadily, the apex apparently still is far ahead and it appears that 6.69c, Chicago mill, fairly represents the market on No. 28 gage black, while 6.19c, Chicago, rules on No. 10, gage blue annealed. A large buyer recently sought in vain to obtain No. 28 gage black at 6.19c, Chicago, which was the maximum a week ago. Demand is strong and the supply much less than the country's requirements. Sheet bars are being supplied in better tonnage, and the output of sheet mills probably will increase shortly.

(*For complete prices see page* 904)

Higher Schedules

Presaged in Rolled Pipe—Cast Pipe Goes Up Steadily

Pittsburgh, April 17.—Contemplated advances in prices of crude oil presage the adoption of higher quotations by makers of iron and steel tubular goods. Inquiries for line pipe are numerous, but no large contracts have been placed recently. This is not surprising, in view of the fact that deliveries are deferred from six to 12 months. Premium prices are being paid for rather early shipment. Builders of merchant and marine boilers for the government are pressing tube makers for deliveries. Iron and steel boiler tubes are commanding premium prices for both prompt and contract shipment.

Cast Pipe Advances $5

Chicago, April 17. — Cast iron pipe again was advanced April 16 $5 per ton in the effort of makers to keep up with increased cost of pig iron. This makes the quotation $58.50 at Chicago for 4-inch pipe and $55.50, Chicago, on 6-inch or larger. Wadena, Minn., is inquiring on 125 tons and bids go in April 17 at Toledo on 90 tons of pipe and 130 tons of fittings. Winnipeg took bids April 16 on 5,000 tons of 48 to 60-inch pipe, on which the award has not yet been made.

Tin Plate Varies

With Sales Closed as High as $10.50 Per Base Box

Pittsburgh, April 17. — Tin plate for rather early shipment has been sold at as high as $10.50 per base box, or $3 above the price offered by the leading interest for delivery in the second half of the year. The bulk of the tonnage for distribution after July 1 has been sold. Manufacturers are meeting specifications from packers in order to serve the government as well as possible. Long and short terne plates are scarce. This is because mills are devoting their entire capacity to tin plate.

The Maxim Munitions Corporation announces that it has signed a contract with the Italian government for the manufacture of 250,000,000 cartridges, deliveries to cover 12 months. The United States government, it was stated, has increased the order for cartridges recently placed with the company.

Buying Stops, Scrap Eases

Slight Recession at Pittsburgh Follows Withdrawal of Corporation Subsidiaries From Market—Other Districts Higher

Pittsburgh, April 17.—From a sentimental standpoint, the iron and steel scrap market has been affected adversely by the withdrawal of sudsidiaries of the Steel Corporation as active buyers of heavy melting stock. The Carnegie Steel Co. discontinued buying after purchasing about 50,000 tons for delivery to its works at Munhall, Pa., at prices ranging from $28 to $30 a ton. Neither the Pittsburgh Steel Co. nor the Jones and Laughlin Steel Co. has figured in the market recently. These and other prominent consumers are refusing to pay $30 a ton for heavy melting stock. Some material has been sold this week at $28 and $29, delivered. Low phosphorus scrap is being held at as high as $40 a ton, or $5 above the previously prevailing maximum. Demand for turnings and borings is heavy, but prices are unchanged. Rerolling rails have been marked up $3 to $34, delivered. Iron foundries and iron rolling mills have been active buyers of scrap.

Wrought is Active

New York, April 17.—Heavy buying of wrought scrap is the principal feature of the old iron and steel market in this district. As a result, wrought pipe is bringing $26 to $26.50, New York, an advance of $2. Good business in borings has advanced prices 75 cents to $1. Clean cast borings now are quoted at $13.50 to $13.75. Heavy melting steel scrap is less active. Demand from the Pittsburgh district rapidly is falling off. Pittsburgh dealers are offering the equivalent of $24 to $24.50, New York, or about 50 cents less than a week ago. Demand for foundry grades continues active. Export inquiries are numerous. It is difficult to do foreign business, not only because of the lack of boats but offers are not attractive.

Great Strength in East

Philadelphia, April 16.—All branches of the scrap iron and steel market here continue to manifest great strength. Wrought scrap and its substitutes are enjoying an extremely good demand and the call for cast scrap is brisk. Demand for steel scrap by consumers here is lagging, the mills contending that they are not interested in the prices that are asked, and that they are willing to take the chance of waiting before covering for their further requirements. Pittsburgh dealers continue to buy all the steel scrap offered here, paying around $25 to $26, f. o. b. shipping point, and sometimes higher. Prices have been advanced $1 on old car wheels and No. 1 heavy cast, and about 75 cents on No. 1 forge.

Cleveland Uncertain, as Usual

Cleveland, April 16.—Dealers in scrap in this district are sending out or receiving few carloads daily, and as business of that size offers little difficulty to the railroads, traffic troubles are almost negligible. The Cleveland scrap market has a reputation of being one of the most perverse and irregular in the country. It apparently follows no set rule or rules and is little susceptible to outside influences, nor is it affected to any considerable degree by pig iron prices or the stock market, the two normal barometers of all scrap markets. It is running time to form at present. Trading is even duller than usual. Heavy melting steel is quoted at $26 to $27; axle turnings, $17.50 to $18; grate bars, $16 to $16.50; stove plate, $15.50 to $16; No. 1 railroad wrought, $29 to $30. Prices generally are holding firmly, although sentiment is appreciably weaker, at least for the time being.

Scrap Scarce at Chicago

Chicago, April 17.—Decided scarcity of iron and steel scrap is manifesting itself in the Chicago market. Usual sources yield comparatively little and even the railroads are not furnishing their normal quotas at this season. This is due partially to lack of cars, and to shortage of labor. Consumers continue buying with the result that the advance is continuing far beyond expectations. During the past week advances of 50 cents to $2 per ton have been made. Railroad scrap lists are few and small. The Michigan Central railroad offers 1,900 tons, the Chicago, Milwaukee & St. Paul railroad 250 tons, and the Monon railroad 530 tons, consisting of relaying rails from 52 to 67 pound sections and angle bars.

Scrap Advance Continues

Cincinnati, April 16.—For the fourth consecutive week iron and steel scrap prices have advanced. Demand for steel scrap is good, but dealers are unable to secure sufficient cars to make satisfactory deliveries. Some melters accordingly are hard pressed for material, and are willing to pay good prices if shipment can be had. Heavy melting scrap is selling at $24 to $25 per gross ton, Cincinnati, largely to users outside this district. No. 1 machine cast is from $19.75 to $20.25 per net ton, an advance of 50 cents. Stove plate, No. 1 railroad wrought, No. 1 yard wrought and bundled sheet scrap, all are 50 cents higher. Cast borings are unchanged but strong.

(*For complete prices see page* 904)

Sell to the East

St. Louis, April 14.—Sharp advances on all grades of old material are shown here. While some local consumers still are hesitating to commit themselves, much scrap is moving from here tb the Pittsburgh and Youngstown districts, and at almost any price set by dealers. Heavy melting steel especially is active, and as high as $29 per gross ton has been paid here for shipment to an eastern market. Relaying rails, both light and heavy sections, are in excellent demand. Dealers are asking and making sales at prices far in excess of new rails. The only railroad offerings last week were 2,500 tons by the Southern railway and 640 tons by the Lake Erie & Western.

Good Demand Prevails

Birmingham, April 15.—Activity prevails in the scrap iron and steel market and dealers are moving stocks readily. Stocks are ample. Prices have fluctuated during the past week, though on the average but two lines show any material increase in price. Heavy melting steel now is quoted at $18 and $19 against $17 and $17.50, and No. 1 machinery cast is at $18 and $19 against $16.50 and $17. Dealers expect further advances.

Concentrates Advanced

New York, April 17.—The leading producer has advanced its price on 60 per cent tungsten concentrates to $20 a unit and this figure now is being quoted here. The market of 60 per cent concentrates, however, has been around $17 to $18 a unit and it is probable this figure still can be done. Stocks of concentrates for spot shipment are not large here but lots of 50 to 100 tons still can be obtained. There is a good volume of inquiry both from domestic and foreign consumers. Among export inquiries are two for approximately 100 tons each for shipment to France and Italy.

F. F. Chadwick & Co. have opened offices at 1111 Land Title building, Philadelphia, to engage in a general coal and coke business.

Coke Softens as Cars Grow

Full Traffic Facilities Available for First Time Relieve Many Consumers—Prices Show Decline

Pittsburgh, April 17. — For the first time in many months, the car supply in the Connellsville regions yesterday and today was reported at 100 per cent. Last week, the supply of cars was estimated at 65 per cent, an increase of 15 per cent, compared with the previous week. Improved traffic conditions are responsible for a recession in prices of spot fuel. Furnace coke is being offered at $7.50, ovens, or 50 cents a ton below the previously prevailing price. Cupola coke for second half shipment has commanded $9.25, ovens; some dealers are asking $9.50. The contract market for furnace coke is quiet. It develops that many foundry managers in Ohio have contracted for retort oven fuel for second half shipment. This will relieve somewhat the pressure for beehive oven coke. Production of coke in the Connellsville regions the week ending April 7, was 379,039 tons, compared with 369,790 tons the week before, according to *The Connellsville Courier*.

Sell Furnace Tonnage

Philadelphia, April 16.—New sales of furnace coke for last half delivery in this district involve at least 40,000 tons and probably considerably higher than this figure. The prices done range around $7.25 to $7.75, Connellsville. Spot furnace coke has been sold in fair quantities at $8 to $8.25, Connellsville. Considerable foundry coke for prompt shipment has been sold at $9.25 to $10, Connellsville, depending upon the quality. There is considerable demand for second half foundry coke.

Small Sales Predominate

Cincinnati, April 16.—Transactions for coke in this district are limited to small lots of foundry grades. Wise county, Pocahontas and New River foundry coke is quoted from $7 to $11, ovens, on contract, and from $10 to $15, ovens, for prompt delivery. Furnace coke from these fields is given from $6.50 to $9, ovens.

Southwest Buys Coke

St. Louis, April 14.—Sudden and urgent demand for coke from the extreme southwest, including Arizona, New Mexico and the Republic of Mexico, has been the feature of the market. Many of these orders leave the price open and ask only for the best terms. The main object is to get the coke. Sales were reported at $9.50, ovens, for 72-hour Connellsville and Virginia foundry coke for last half delivery. Quotations for scattering cars are from $11.50 to $13, according to delivery. Deliveries on contract are woefully backward, and consumers are complaining bitterly of railroad service.

New Plants Starting

Birmingham, April 17.—Coke supplies have been increased by the operation of the by-product coke plant of the Gulf States Steel Co. at Attalla, consisting of 37 Koppers ovens, which adds about 500 tons daily. The supply will be further increased later by the resumption of the old city beehive ovens of the Sloss-Sheffield Steel & Iron Co., the city commission having granted permission. It is understood the permission is for a period not exceeding three years, and that in the meantime the Sloss-Sheffield Steel & Iron Co. will make arrangements to get a better supply of coke, the inference being that a by-product coke plant would be constructed. Strong prices for coke prevail. Furnace fuel has been sold as high as $8, in small tonnage, and foundry coke at $15. The average price for furnace coke, regular customer, is under $7.50, and for foundry coke, $10 to $12.50. An outside inquiry again is current, while the home consumption is likely to be increased since several furnaces are being put in readiness for early operation.

Discuss Cost Systems

To maintain their present position in domestic and foreign trade after the war, American manufacturers will be compelled to adopt highly developed cost systems. C. E. Knoeppel, expert accountant, identified with the American Foundrymen's Association, told members of the Pittsburgh Foundrymen's Association April 16, at the Fort Pitt hotel, Pittsburgh. The program was devoted to cost problems, which were discussed by members of a special committee appointed a couple of years ago by the American society. B. D. Fuller, the Westinghouse Electric & Mfg. Co., Cleveland, explained in detail, the work undertaken by the cost committee of the American society. He told how many foundry managers had been driven to bankruptcy through inadequate systems of computing costs. H. J. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa., after explaining the expense attached to the office of a cost accountant, declared that much of the ruinous competition experienced several years ago was the direct result of inadequate cost systems.

J. Roy Tanner, Pittsburgh Valve Foundry & Construction Co., Pittsburgh, referred to a number of typical bids submitted by foundry managers on castings of various types.

(For complete prices see page 904)

Wire Advanced

By Independent Mills, But Largest Maker's List Unchanged

Pittsburgh, April 17.—Several independent wire makers have advanced prices $3 to $6 a ton. One company today put up prices all along the line $6 a ton to $3.50 a keg for nails, the highest price recorded in the history of the trade in this country. Several prominent makers of fencing wire have advanced quotations three points to 48 per cent off the list. The American Steel & Wire Co. has made no change in its quotations since March 5, last, when all products were advanced $4 a ton to $3.20 a keg for nails. Wire makers have not been figuring in the market actively for several weeks. Deliveries are deferred from three to five months. The American Steel & Wire Co. is filling a contract for 100 anti-submarine nets for the government.

Furnaces Are Licensed

New York, April 17.—Additional licenses for heroult electric furnaces have been granted by the United States Steel Corporation. The Alaska Treadwell Gold Mining Co., Treadwell, Alaska, will install one 2-ton furnace to melt cold scrap for steel castings. The Heppenstall Forge & Knife Co., Pittsburgh, will install one 6-ton furnace to melt cold scrap for forging ingots. This is the second 6-ton heroult furnace to be licensed to this company. The General Motors Co. will install one 6-ton furnace at the plant of the Samson Sieve Grip Tractor Co., Stockton, Cal., and one 6-ton furnace in a new plant which it is about to build at Saginaw, Mich. Both furnaces will melt cold scrap ofr steel castings. The Bethlehem Steel Corporation has been licensed to install one 6-ton furnace at South Bethlehem, Pa., to melt cold scrap for the production of ingots for forging projectiles.

First Ore Shipment

Cleveland, April 17. — The first ore shipments have been made to upper lake ports, a trainload from Iron Mountain, Mich., having reached Escanaba. The

steamer WILLIS L. KING is at Escanaba and probably will be the first ore carrier to load. Ice conditions show little improvement. Some success has met the efforts to break up the ice in connecting channels. Buffalo harbor is still blocked. The full fleet will not be in commission before next week.

Dividend Passed

Directors of the Wellman-Seaver-Morgan Co. have decided to pass the quarterly dividend payable April 15 on the cumulative preferred stock.

The new president, E. S. Church, states that the company has sufficient surplus to warrant the payment and that the business on hand to be completed in 1917 indicates a liberal profit for the year, but that 1916 earnings were unsatisfactory, and that increased cost of inventories and the financing of the company's obligations make it advisable that no dividend disbursement be made at this time.

Recent appraisal of the real estate makes its value $782,000, nearly five times what it used to be carried at, the original purchase prices. It is stated that prospects for early resumption of the preferred dividend are excellent. The company has made arrangements by which its financial needs are taken care of.

Furnace Breaks Record

No. 1 blast furnace of the Shenango Furnace Co. at Sharpsville, Pa., broke all previous daily records, April 16, when it produced 700 tons of bessemer metal. The stack has a rated capacity of 500 tons a day. It has not been relined or repaired for several years.

The Bacharach Industrial Instrument Co., Pittsburgh, manufacturer of gas meters, pressure and draft recorders, thermometers, etc., has moved from 14 Wood street into larger quarters at 422 First avenue. Because of increasing business, it was necessary for the company to enlarge its space and install additional equipment.

The Ferguson Iron & Steel Co., Buffalo, which since its expansion of last year, now has a capacity for fabricating about 2,000 tons of structural steel per month, expects to make further enlargements which will make its capacity about 4,000 tons monthly by the end of the year.

The Philadelphia & Reading railroad is taking bids for a one-story engine and power house and coal pockets at Rutherford, Pa.

Begin Rail Buying for 1919

Western Roads Place Tonnages Year and Half Ahead and Inquiries Total 150,000 Tons—Cars Dull

New York, April 18. (By wire.)—Exceedingly heavy rail inquiry is under negotiation with domestic rods for 1919 delivery. It is difficult to estimate this tonnage, but many hundred thousand tons are involved. The Northern Pacific placed 40,000 tons of rails for the last quarter of 1918. Two lots of 20,000 tons each have been placed by the French government and about 15,000 tons by the Italian government. Huge additional foreign buying of railroad requirements indicated by tentative inquiries.

Steel makers are now confronted with many difficult problems attendant upon war preparations. Tin plate and agricultural implement makers and other industries closely associated with question of food supply are in market for huge tonnages of steel in addition to their regular contract committments. Plans are being worked out whereby all war requirements will be given precedence over everything else. Southern iron is selling at $34, Birmingham, this year. Bookings of steel continue in excess of productive capacity.

Locomotive Orders Active

New York, April 17.—The Pere Marquette railway has ordered 25 locomotives from the American Locomotive Co. This builder also has taken two locomotives for the Chicago & Illinois Midland railway, five for the El Paso & Southwestern, 10 for South African railways and 50 for Canadian government railways. The Baldwin Locomotive Works received 16 for the Carolina, Clinchfield & Ohio railroad.

Spikes Up $4

Pittsburgh, April 17.—Standard spikes have been advanced $4 a ton to .385c for sizes 5½ x ⅝-inch and larger; to 4.25c for ½-inch, ⅜-inch and 7/16-inch; to 5.25c for ⅝-inch and to 4.25c for bolt spikes. Specifications are heavy but no large orders have been placed recently. Prices of light steel rails are likely to be advanced soon. Traction line interests and coal mine operators are seeking light rails actively but have trouble to get them. Track bolts have commanded as high as 8.10c for early shipment; makers are asking 5.50c as a minimum.

The Smith Gas Engineering Co., Lexington, O., which is building a new plant at Dayton, O., will move its headquarters to Dayton when the new plant is completed. The Lexington plant, however, will be continued in operation. The buildings to be erected at Dayton include a machine shop 108 x 400 feet; a foundry 100 x 200 feet; a laboratory and power plant and a 2-story and basement office building, 40 x 70 feet. It is expected the new plant will be ready for occupancy about July 1.

(For complete prices see page 904)

Would Standardize Screw Thread Tolerances

Washington, April 17. — Representative John Q. Tilson has reintroduced in the house a bill to provide for the appointment of a commission to standardize screw thread tolerances. This commission would consist of six members, one a commissioned officer of the army, to be appointed by the secretary of war; one a commissioned officer of the navy, to be appointed by the secretary of the navy, and four to be appointed by the secretary of commerce, one of whom shall be the director of the bureau of standards, two from nominations made by the American Society of Mechanical Engineers or by the joint conference committee of engineering standards of the national engineering societies, and the other from nominations made by the Society of Automobile Engineers.

The commission would be required to ascertain and establish a standard or standards for screw thread tolerances, to be submitted to the secretary of war, the secretary of the navy and the secretary of commerce for their acceptance and approval. Such standard or standards when approved would be adopted and used in the several manufacturing plants under the control of the war and navy departments, and, so far as practicable, in all specifications for screw threads in proposals for manufactured articles, parts, or materials to be used under the direction of these departments.

The Mott Sand Blast Mfg. Co., 893 East 134th street, New York City, has just completed a new plant at Brooklyn, N. Y. The new quarters have been especially fitted up with facilities for manufacturing sand blasting and allied equipment on which the company has specialized.

The Chicago office of the Central Steel Co., of Massillon, O., A. Schaeffer, district representative, will remove, May 1, to 1370 Peoples Gas building, 122 South Michigan avenue.

Big Merger

Will Make U. S. Factor in World Dye Trade

A dye and chemical amalgamation, including the National Aniline & Chemical Co., the Schoellkopf Aniline & Chemical Works and the W. Beckers Aniline & Chemical Works and the Benzol Products Co., has been effected.

The company is to be known as the National Aniline & Chemical Co. No one company is to have a controlling interest in the new corporation.

The new corporation will take over the line of dyestuffs of the Schoellkopf Works, the dyestuffs of the Beckers Works, the facilities for the production of aniline oil and salts and certain of the coal tar intermediates of the Benzol Products Co., and also processes in coal tar intermediates of the General Chemical, the Semet Solvay and the Barrett companies. The company will accordingly be in a position not only to make the intermediates and dyestuffs now being made by those concerns, but it hopes ultimately to be able to extend its facilities to other fields.

It has been pointed out that the company will be able to produce approximately 150 of the dyes necessary to the industries of the country. The known number of colors is about 1,000, more than three-quarters of which, however, are not considered essential to the large industrial interests of the nation. The American dye industry is now supplying practically all of the colors needed and this hold upon the trade is expected to be increased before the end of the war and the resumption of competition from Germany.

No important changes in the personnel of the present companies is contemplated in the organization of the National Aniline & Chemical Works, Inc. The present managements will continue and the officials of the new corporation will be selected from them. While each of the companies expects a considerable enlargement of its facilities, it is not believed that the introduction of new money will be required. The companies are well situated financially, as a result of war conditions, and are prepared to expand through the use of earnings and surplus.

The American Tube Works, Somerville, Mass., has shut down for an indefinite period owing to labor troubles. A strike of 175 of the 800 employes so crippled the departments that the plant could not be operated at a profit. The strikers demand an 8-hour work day and a 25 per cent increase in wages in place of a 9-hour day with a Saturday half holiday.

Support Compulsory Service

Twenty men, including George W. Goethals, Thomas A. Edison, W. F. Durand, W. F. M. Goss, Charles F. Rand and W. H. Wiley, have appealed to the members of five engineering societies to support the Chamberlain bill providing for compulsory universal military and naval training and service. The engineers are requested to ask their representatives and senators in congress to support and vote for the plan covered by the bill; preferably with such modification of it as may be recommended by the general staff of the army and the general board of the navy. The petition was addressed to the members of the American Society of Civil Engineers, American Society of Mining Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and American Institute of Consulting Engineers.

Discuss Furnace Practice

Blast furnaces and chemical processes involved in the reduction of iron from iron ore were discussed at a recent meeting of the Chemists Club held in the Youngstown Y. M. C. A. The meeting was conducted by the Brier Hill Steel Co. chemists and the chief speaker of the evening was Chief Chemist H. E. Moyer, whose subject was "The Structure of Blast Furnaces".

Will Start Mills

Orders for the carrying out of a full operating schedule at all of the Bethlehem Steel Co.'s properties are being applied at the American Iron & Steel Mfg. Co. plant at Lebanon. The puddling mill department of the East works which has been idle for the past 10 years, is being thoroughly overhauled and is expected to be started shortly.

Acquires Charcoal Land

The Charcoal Iron Co. of America has purchased a tract of 53,000 acres of timberland in northern Wisconsin and the Upper Peninsula to provide supplies for the manufacture of charcoal. Of this land 10,000 acres are located in Ashland county and the remaining 43,000 acres in Luce and Chippewa counties, Mich.

National Topics

To Be Discussed by National Metal Trades Association

In view of the present national situation the National Metal Trades Association has arranged a program of timely interest to be presented at its annual meeting in New York. The session Wednesday morning, April 25, will open with usual routine duties to be followed by reports of the standing committees. These reports will embrace the following subjects: "Industrial Education," F. A. Geier, chairman; "Apprenticeship," W. A. Viall, chairman; "Membership," John W. O'Leary, chairman; "Prevention of Industrial Accidents," F. E. McKee, chairman.

The program Wednesday afternoon is devoted to a number of papers of unusual interest at this time. These papers are as follows: "The Council of National Defense," Howard E. Coffin, chairman, Council of National Defense; "The Banker's Co-operation With Industry," F. C. Schwedtman, National City Bank, New York; "National Industrial Conference Board," William H. Barr, president, National Founders' Association, and "The American Institute of Weights and Measures—What it Stands For," Luther D. Burlingame. The convention banquet will be held Wednesday evening.

The Thursday morning session will be devoted to the presentation of papers and short discussions. The program will be presented as follows: "Merchant Marine," Wallace Downey, New York City; "Short Business Talks," by A. L. Humphrey, Westinghouse Air Brake Co., Pittsburgh; George F. Steedman, Curtis & Co. Mfg. Co., St. Louis; Frank A. Scott, Warner & Swasey Co., Cleveland, and James T. McCleary, American Iron and Steel Institute, New York.

Detroiter Speaks

Chester M. Culver, manager of the Employers' Association of Detroit, spoke April 16 before the Builders' Exchange, Cleveland. Mr. Culver attributed the remarkable growth of Detroit to the open shop principles which the city of Detroit has advocated for a number of years. "We believe," said Mr. Culver, "that the principles of the open shop are fair and worthy of consideration. Any city of manufacturing importance may expect labor difficulties if the proper steps are not taken to protect its industries against the demands of organized labor."

The ninth semi-annual meeting of the American Institute of Chemical Engineers will be held in Buffalo, N. Y., June 20 to 22.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

E. F. ARCHIBALD, T. S. Dunn, Karl Shriver, George J. Richers and R. P. Pennoyer, Pittsburgh engineers, have been accepted as commissioned officers in the army. In Cleveland the services of many prominent iron and steel men have also been accepted. Among the men in this district are H. P. Bingham, Upson Nut Co.; C. C. Bolton Jr., Bourne-Fuller Co.; A. T. Chisholm, Chisholm Steel Shovel Works; R. F. Grant, M. A. Hanna & Co.; and S. Livingston Mather, Pickands, Mather & Co., who will serve as deputy recruiting officers. Bertram D. Robinson, long a salesman for Philips Isham, New York, has enlisted in the British navy, while R. C. Bolling, of the United States Steel Corporation, is a leading spirit in the aviation corps.

S. W. Croxton, director of the Cleveland Furnace Co., has returned from a two months' trip to Hawaii.

Maj. Harry L. Morse, U. S. A., has been transferred from the Watertown arsenal, Watertown, Mass., to the Benicia arsenal, Benicia, Cal.

J. G. Derricks, formerly identified with the New York office of the American Steel & Wire Co., now is assistant general manager of sales of the Pittsburgh Steel Co., Pittsburgh.

C. S. Goodwin, for 11 years connected with the Stone & Webster Corporation, Boston, has been appointed manager of the Lau Iron Works, Youngstown, O.

W. H. Eshleman, plate mill roller of the Republic Iron & Steel Co., Youngstown, O., has been appointed superintendent of the plate mill department of the Youngstown Sheet & Tube Co.

S. Livingston Mather, secretary of the Cleveland Cliffs Iron Co., who last summer attended the Plattsburg training camp, recently volunteered and was accepted as an assistant to army recruiting officers in Cleveland.

Guy F. Whitney, New Hartford, Conn., who has been in charge of the construction of a munitions factory for the Canadian government at Lindsay, Ont., for the Westinghouse interests, has been transferred to Bloomfield, N. J.

J. B. Bonner, sales representative of the Carnegie Steel Co. at Philadelphia, is in charge of a suite of offices at Washington which the United States Steel Corporation has offered in order to expedite the handling of war orders for the government.

Herbert W. Strong was unanimously re-elected president of the National Supply and Machinery Dealers' Association at its convention in Memphis, Tenn. Mr. Strong is secretary of Strong, Carlisle & Hammond Co., Cleveland, dealer in machinery and mill supplies.

Daniel L. Turner, for several years deputy engineer of subway construction in New York, and since last October acting chief engineer for the Public Service Commission of New York, has been appointed chief engineer, effective Oct. 9. He succeeds Alfred Craven, who, since last October, has served as consulting engineer to the commission.

Willys McKee, formerly superintendent of the Elyria branch of the Elyria Iron & Steel Co., has been transferred to the superintendency of the Cleveland branch, and John Wheeldon, 27 years with the American Steel & Wire Co., and for six years superintendent of the Cuyahoga works at Cleveland, has become superintendent of the plant at Elyria.

Dr. Ira N. Hollis, president of the Worcester Polytechnic institute, Worcester, Mass., and president of the American Society of Mechanical Engineers, has been appointed by Secretary of War Baker a member of a board to meet at the call of the president of the army war college, Washington, D. C., to carry out instructions of the secretary of war as to coast fortifications.

R. Tinsley, formerly secretary-treasurer, R. B. Sheridan, president of the Allied Machinery Corporation, and Harris D. H. Connick, construction expert at the San Francisco exposition, have been elected vice presidents of the American International Corporation. Cecil Page will succeed Tinsley as secretary and Thomas S. Streeter will take over the duties of treasurer.

Henry W. Heedy, formerly sales manager of the Andrews & Hitchcock Iron Co., and with the Youngstown Sheet & Tube Co. since the purchase of the former concern by the latter, has retired. He will maintain offices with the Lake Erie Limestone Co. Mr. Heedy was for years connected with the Youngstown Iron & Steel Co., both as director and vice president and during the recent transfer of its stock to the Sharon Steel Hoop Co. was treasurer for a period. He remains one of the four Ohio directors of the company.

James Bowron, president of the Gulf States Steel Co., Birmingham, Ala., is suffering from a severe attack of muscular rheumatism. Mr. Bowron has been at his home for nearly seven weeks.

John N. Reese, formerly superintendent of northern blast furnaces for the Republic Iron & Steel Co., has been placed in charge of mining operations with the title of assistant to the general superintendent. He succeeds John E. Perry, recently resigned to go to the Brier Hill Steel Co. as head of the mining and transportation department. With the Republic Mr. Perry was general manager of mines. C. E. Crowthers, superintendent of the Haselton blast furnaces here, has been advanced to the post vacated by Mr. Reese. A. W. Haven has been named superintendent of the Haselton furnaces.

Obituary

Dr. Richard W. Boland, formerly president of the Birmingham Machine & Foundry Co., Birmingham, Ala., died in Texas on April 15. Dr. Boland was one of the pioneers in the machine shop and foundry business in the Birmingham district. He was particularly well known in Caribbean and Central American countries.

President Grace of the Bethlehem Steel Corporation recently announced a 10 per cent increase in the wages of 50,000 employes of the company, effective May 1. The South Bethlehem, Steelton and Lebanon, Pa., and Sparrows Point, Md., plants are affected.

The Clinton Wire Cloth Co., Clinton, Mass., has given its 1,000 employes a 10 per cent increase in wages, effective on May 1. The company also has reduced working hours of certain departments from 60 to 54 per week without wage reduction.

Plan Quick Movement War Materials

Pittsburgh, April 18. (By wire.)—Officials of leading steel companies and representatives of railroads will confer next week with the National Defense Council at Washington to discuss plans to expedite the movement of commodities entering into the manufacture of materials wanted by the government, for war purposes. The railroad traffic situation was discussed yesterday at a joint meeting of shippers and railroad officials at Pittsburgh.

No Coal Strike

Pittsburgh, April 18. (By wire.)—The possibilities of labor trouble in the bituminous coal fields in western Pennsylvania, Ohio, Indiana and Illinois was averted yesterday by the signing of an agreement at New York through which the miners will receive a 20 per cent advance in wages.

Car Supply Smaller

Pittsburgh, April 18. (By wire.)—Car supply in the Connellsville regions today is estimated at 70 per cent with prospects of a similar supply tomorrow.

To Hear Ore Complaints

Washington, April 17.—At request of railroads themselves the interstate commerce commission has set next Monday, April 23, as the day for hearing before the suspension board of protests against proposed increase of 15 cents per ton on iron ore from Lake Erie ports to inland furnaces. So far only two protests have been filed, one by Joseph Thropp, with merchant furnaces at Earlston and Saxton, Pa., and the other by the Columbus Iron & Steel Co., Columbus, O. Other protestants are expected.

The regular monthly meeting of the New England Foundrymen's Association at Boston, April 11, was addressed by Wallace T. Montague, sales engineer of the Norton Co., Worcester, Mass., on "The Manufacture of Grinding Wheels and Their Use in the Foundry". The meeting was preceded by a dinner.

Because of extremely high prices of building material and shop equipment, the Northern Boiler & Structural Co., Appleton, Wis., has deferred its plans to erect a new shop building. It is stated by the company that in addition to the obstacles imposed by high prices, the uncertainty in deliveries has made the project unwise at the present time.

"Voltage Regulation of Large Transmission Systems", was the subject of illustrated papers read before the Pittsburgh section of the American Institute of Electrical Engineers, April 10. E. C. Stone and H. L. Fullerton, of the Duquesne Light Co., and J. E. Thomas, of the West Penn Power Co., Pittsburgh, were the speakers.

The plant of the Penn Iron & Steel Co., Lancaster, Pa., after having been idle for several years, again is in operation. One bar mill now is being operated on a day and night schedule, and two additional mills soon will be put into operation.

The Pittsburgh Iron & Steel Foundries Co., Pittsburgh, is considering plans for remodeling its power house at its works at Midland, Pa. Barton R. Shover, consulting engineer, Pittsburgh, has been retained to take charge of the undertaking.

One of the warehouses of the American Tube & Stamping Co., Bridgeport, Conn., recently was damaged by fire, believed to have been caused by inflammable bomb. Contents of the building were chiefly bricks and cement.

The foundry of Westover & Lindly, Lincoln, Neb., recently was badly damaged when flooring under the cupola of the casting room caught fire. The foundry was owned by C. Edward Westover and Henry A. Lindly.

The Bethlehem Bridge Commission, Bethlehem, Pa., has commissioned Clarence W. Hudson, New York, to draw the plans and specifications for a huge steel bridge to span the Lehigh valley between Bethlehem and South Bethlehem.

The Argentine government has approved plans for widening the spans and reconstructing the approaches of the bridge over the Gualeguay river in Rosarie Tala, Entre Rios, the im provements to cost $72,888.

The Union Iron Products Co., East Chicago, Ind., maker of galvanized iron and steel products, advises it has increased its capital stock from $50,000 to $75,000 to put in additional machinery.

The American Zinc Co. purposes to build an addition to its zinc mill in Mascot, Tenn., to cost $80,000.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, April 17.—Little light has yet been thrown upon the government's intentions as to its purchases of metals and prices to be paid; the resultant uncertainty has continued an influence against activity in the metal markets. Business in all non-ferrous metals, except antimony, was extremely light the past week.

Copper sales have been limited to small lots by second hands and prices have been steadily growing softer. Even producers have altered their views to a lower level for third quarter electrolytic. Present quotations for electrolytic copper are as follows, on the basis of cash, New York: Prompt and April, 32c; May, 31c to 31.50c; June, 30c to 30.50c; third quarter, 28c to 29c. Prime lake is quoted 32.50c to 33c for prompt shipment. Casting copper is quoted from 30.50c to 31.00c.

In spelter, producers seem to have almost reached the limit as regards concessions, in view of present costs. Prompt prices are weak, but futures are slightly firmer. Prime western quotations, St. Louis basis, are about as follows: Prompt and April shipment, 9.50c; second quarter, 9.37½c to 9.50c; third quarter, 9c.

The lead market is technically strong, and prices are nearly as high as those for prime western. Little change has taken place the past week, although views of outside sellers have strengthened somewhat. Quotations in the outside market follow: Prompt shipment, St. Louis, 9.25c; April, 9.12½c; May, 9c.

A fair volume of business is moving in the aluminum market and prices are firm. Prompt carloads may be quoted as follows: No. 1 virgin, 60c to 62c; No. 1 remelted, (98 to 99 per cent), 56.50c to 59c; No. 12 remelted, 41c to 43c.

Speculative trading in antimony futures has been heavy this week, while consumers have bought some spot lots at around 35c, New York. Considerable trading has been done in March shipment from the far east, but all positions have been active, up to and including May. Quotations follow: Spot, 35c to 36c; February shipment, 23.50c to 24c; March, 17.25c to 17.75c; April, 15.12½c to 15.25c; May, 14.12½c to 14.25c.

The tin market has been influenced by reports of a possibility that the United States government may impose an import duty of 10c a pound on this metal. Consumers have been more actively inquiring for stocks already in America or due to arrive within the next few days. The market is strong in New York, while almost daily advances have been recorded in London and in the East Indies. Spot Straits is quoted 55c to 55.-12½c, New York, today.

(*For complete prices see page* 904)

What Peace Means to Steel Trade

Great Additions to World's Steel Making Capacity Brought About by the War Raises Vital Problem of Absorption of Increased Tonnage by Commercial Necessities When Normal Conditions Are Restored

BY SAMUEL A. BENNER

WHEN the great war broke out in 1914, its first effect on the iron industry of the United States was very depressing. As the months went by, however, two facts of prime importance became manifest: First, that modern warfare requires immense quantities of iron and steel, as well as other metals and supplies; and, second, that a wall had been placed around the iron industries of Belgium, northeastern France, Germany (including Luxemburg), and Austria-Hungary, which prevented competition from these countries in the markets of the world. Great Britain soon discovered the paramount necessity for iron and steel in modern warfare, and rapidly withdrew such products from international trade. Russia, France and Italy speedily became heavy buyers since they needed much more tonnage than they could make themselves.

Last year the United States, in meeting the necessities of the allies for war materials and for civilian consumption, in addition to filling ordinary export requirements and the vastly increased domestic demand, produced the greatest quantity of steel in the history of the country. This was about 41,000,000 gross tons of ingots, including steel castings, against 32,000,000 tons in 1915, 24,000,000 tons in 1914, and 31,000,000 tons each in 1913 and 1912. Of the 1916 output, at least one-fourth, or over 10,000,000 gross tons, was made for exporting in some form or other. Shell rounds and shell blooms alone constituted a heavy item, requiring probably 3,500,000 gross tons of ingots. Ship building took a very heavy tonnage for ships sold abroad.

The extent of our foreign business in steel last year indeed is a matter for congratulation, especially when it is remembered that prior to the war the United States seldom used over 4,500,000 gross tons of ingots per annum in its outside trade. Prices have soared to fabulous heights, particularly for export, and while 1917 bids fair to be a duplicate of 1916, we must recognize the fact that such favorable conditions will not continue for long. It will be my endeavor in this article to analyze the situation that will confront us during the next few years, when the present tremendous consumption of iron and steel for war purposes is over.

At the present stage of the evolution of industry throughout the world, the making of iron in its various forms largely is concentrated on the shores of the north Atlantic ocean, due to the presence there of extensive areas of coal with iron and limestone in close proximity. These two great districts, the American, extending from Milwaukee and St. Louis on the west to New York and Baltimore on the east, and the European, extending from Great Britain on the west to southern Russia on the east, produce a very large percentage of all the iron made in the world, certainly not less than 90 per cent. These districts not only manufacture iron in all its forms for home consumption, but also for shipment to the great non-producing markets, Latin America, Asia, Africa and Australia.

Ever since the United States began

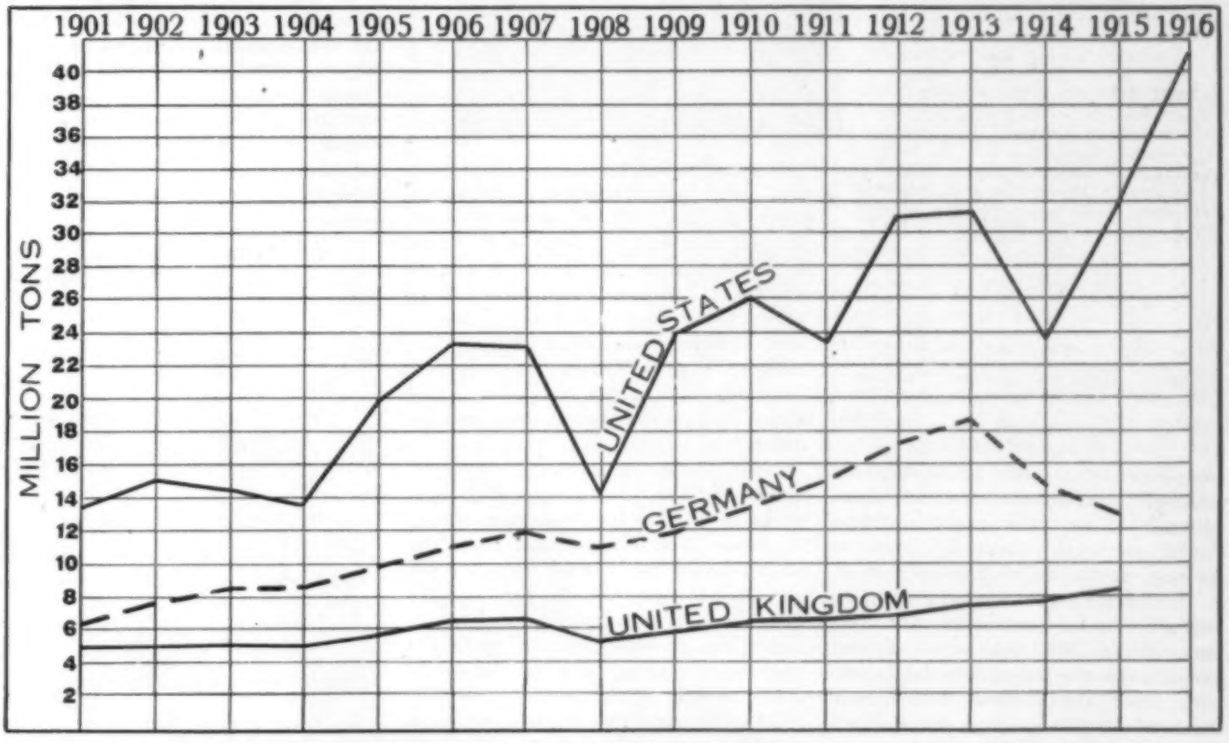


CHART SHOWING STEEL PRODUCTION OF THE THREE CHIEF COMPETITORS

in the last decade of the nineteenth century to engage in overseas trade in various forms of iron, the only competition for the non-producing markets in a broad sense has been between these two great districts. For a quarter of a century prior to the war, neither district shipped much to the other, the exchanges being negligible in proportion to the outputs. Since 1900, the tonnages sent overseas to the non-producing countries from the United States have steadily increased. For some years past they have constituted a perceptible market factor. It is a well-known fact that prior to the war the extent of the demand from the non-producing markets made the difference between good times and bad times to the iron trade of Europe. This was not so markedly the case with the United States. Still our overseas trade when fair has helped to make good times for us.

In this connection, care must be taken not to misread the published figures of the iron and steel exports of Europe. The latter is not one country under one government, like the United States, but consists of a number of countries, each publishing figures for export. Considerable percentages of these figures simply comprise shipments over short distances into neighboring countries, and really mean local business in the great European district. Such were the tonnages that prior to the war moved from Belgium and Germany into Great Britain for further manufacture there. In other words, the gross total of all the published exports of Europe did not go into the non-producing markets. Nevertheless, Europe's share of the neutral trade, prior to the war, was very much more than that of the United States.

The extraordinary demand for iron and steel upon the United States from abroad became insistent early in 1915. It was so great that when it was added to the resumed domestic demand, it compelled the building of much additional steelmaking capacity. The immense requirements from military and naval sources compelled additions also in the countries of the allies and in some of the neutral states.

Taken from information carefully collected, the new "capacities" in gross tons of ingots per annum, shown in Table I, have been built since the beginning of the war, or July 1, 1914, or will be completed by Jan. 1, 1918. The term "capacities" is taken to mean the possible outputs when the controlling factors are all favorable, such as full order books, plentiful railway equipment, absence of labor troubles, etc. Throughout this article the term ingot will include steel castings.

When the central empires had taken possession of Belgium, Luxemburg and northeastern France, and later on of Russian Poland, thus adding the iron and steel industries of these countries to those of Germany and Austria-Hungary, they controlled a total ingot capacity of 29,000,000 gross tons per annum. Prior to the war a large percentage of this tonnage was used for export into the non-producing markets. The central empires having been eliminated from international trade, and requiring the steel for their own use, this large percentage became available for military purposes. Moreover, the war stopped ordinary construction work. In consequence, there have been no increases of moment in the areas now dominated by the central empires.

Of the 11,000,000 gross tons per annum of new capacity in the United States, but little is located outside the great American district extending from Milwaukee and St. Louis on the west to New York and Baltimore on the east. This district accordingly is relatively more important than ever.

On July 1, 1914, the "capacities" of the steelmaking countries of the world in gross tons annually were approximately as shown in Table II. Apart from the 15 countries given in this table, the world could not produce 500,000 gross tons per annum, at the very highest estimate, either in 1914 or at the present time.

On Jan. 1, 1918, the United States will thus possess a capacity of 48,000,000, Canada, 2,100,000, Italy 1,700,000, Russia (area before the war) 6,000,000, British Isles, 11,000,000, Spain, 600,000, Sweden, 900,000, Japan, 600,000, and France (area before the war) 5,550,000 gross tons of steel per annum.

A 100,000,000-Ton World

All the figures of capacity given in these tables are quite conservative, and their sum is 101,800,000 gross tons. For the first time in history, during the latter part of the present year, the world's yearly ingot capacity will reach 100,000,000 gross tons. These tables disclose the following interesting facts:

1. In three and one-half years the world's yearly capacity in gross tons will increase from 85,000,000 to 102,000,000, or by 17,000,000, or by 20 per cent.

2. In three and one-half years the United States' yearly capacity in gross tons will increase from 37,000,000 to 48,000,000, or by 11,000,000, or by 30 per cent.

3. Prior to July 1, 1914, the United States controlled 44 per cent of the

Steelmaking Capacity

Table I

Country.	New capacity.
United States	11,000,000
Canada	900,000
Italy	700,000
Russia	1,000,000
British Isles	2,500,000
Sweden	200,000
Spain	200,000
Japan	300,000
France	750,000
Total	17,550,000

Table II

Country.	Capacity July 1, 1914.
United States	37,000,000
Canada	1,200,000
Mexico	150,000
British Isles	8,500,000
Belgium	2,600,000
France	4,800,000
Sweden	700,000
Spain	400,000
Germany, includ'g Luxemburg	19,500,000
Italy	1,000,000
Austria-Hungary	2,800,000
Russia	5,000,000
Japan	300,000
Australia	150,000
India	150,000
Grand total for world	84,250,000

Table III

Country.	Capacity July 1, 1914.	Additions.	Capacity Jan. 1, 1918.
British Isles	8,500,000	2,500,000	11,000,000
Belgium	2,600,000	.....	2,600,000
France	4,800,000	750,000	5,550,000
Sweden	700,000	200,000	900,000
Spain	400,000	200,000	600,000
Germany	19,500,000	.....	19,500,000
Italy	1,000,000	700,000	1,700,000
Austria-Hungary	2,800,000	.....	2,800,000
Russia	5,000,000	1,000,000	6,000,000
Totals	45,300,000	5,350,000	50,650,000

Table IV

STEEL PRODUCTION, GROSS TONS.

	U. S.	United Kingdom.	Germany.
1916	41,000,000	.....	.....
1915	32,150,000	8,500,000	13,020,000
1914	23,510,000	7,835,000	14,620,000
1913	31,300,000	7,665,000	18,650,000
1912	31,250,000	6,800,000	17,020,000
1911	23,675,000	6,460,000	14,780,000
1910	26,095,000	6,375,000	13,480,000
1909	23,955,000	5,880,000	11,850,000
1908	14,025,000	5,300,000	11,000,000
1907	23,360,000	6,520,000	11,855,000
1906	23,400,000	6,460,000	10,930,000
1905	20,025,000	5,810,000	9,945,000
1904	13,860,000	5,025,000	8,790,000
1903	14,535,000	5,035,000	8,650,000
1902	14,945,000	4,910,000	7,660,000
1901	13,475,000	4,905,000	6,290,000

world's capacity; after Jan. 1, 1918, it will control 47 per cent.

4. Of the new capacity the United States will have almost two-thirds.

Another highly significant fact in the present situation is the enormous direct consumption of steel for war purposes. When this consumption, literally by millions of tons, in the form of shells, ordnance, war ships, motor cars, railway materials, etc., is considered, it may not be out of the way to estimate that 25 to 30 per cent of the world's total capacity now is being devoted to war purposes. This consumption is the primary cause of the present remarkable conditions. It is requiring a much larger percentage of Europe's steelmaking capacity than of ours. Without it the increases in capacity would have been built gradually and not suddenly. When the war is over, the iron trade everywhere must reckon with these increases.

To summarize, the great European district, after Jan. 1, 1918, will control a total ingot capacity of over 50,000,000 gross tons per annum, as shown in Table III. If the allies are able to push back the present eastern and western war lines, some of this capacity may be temporarily wrecked.

Our European Competitors

Spain and Italy never have been factors in the international trade, due to the high cost of production caused by the absence of coal; for the same reason they will not be factors in the future. Sweden, also without coal, will participate in international commerce as before, only in high-grade steels. Russia will need all the steel it can make for home consumption. Deducting 8,300,000 tons, the combined capacity of Italy, Russia and Spain after Jan. 1, 1918, and 750,000 tons, Sweden's capacity for low-grade steel required at home, or a total of 9,050,000 tons, from the grand total of 50,650,000 tons, there is left in the great European district 41,600,000 gross tons of capacity per annum that can participate in overseas international commerce. All this capacity is advantageously located for such trade. It is near the various seaboards, thus necessitating only short hauls to shipping ports.

In comparison, the United States after Jan. 1, 1918, will have 45,000,000 gross tons per annum of ingot capacity well located for overseas international commerce, as not over 3,000,000 of the country's 48,000,000 tons capacity are disadvantageously located for this trade.

Prior to the war, the great American and European districts were able to deliver iron and steel products to their respective seaboards at about the same cost per ton. The American producer overcame his higher labor rates by a more elaborate mechanical plant equipment, which increased the output per man, and his longer railroad hauls by much larger freight car units, thus reducing the per ton mile freight costs.

The European district considered collectively as one great and formidable competitor has one tremendous advantage over the United States in the control of an extremely large percentage of all the freight-carrying boats in the world. Before the war, our small percentage of the overseas non-producing markets was due somewhat to this lack of boats on our part. It is not safe to rely largely on our competitors' boats for the carriage of our freights. How much the lack of boats will handicap us after the war cannot be forecast, but it certainly will prove a disadvantage. Our position as regards boats is being bettered. The exceedingly high profits obtainable from ocean transportation during the war have caused the establishment of new ship building plants along both the Atlantic and Pacific seaboards, and have stimulated ship building on the Great Lakes. Many of the new boats now building are for foreign owners; at the same time a large number of them will fly the American flag.

After the war our capacity for ship building will be three or four times what it was before the war. The application of American methods to ship building, especially the standardization of the boats, and the speed of the manufacture, under our new conditions of large outputs, will undoubtedly enable us to produce boats at costs comparing fairly well with those elsewhere. As a whole, the outlook for our merchant marine is better than it has been since before the Civil war. The peculiar conditions now confronting us, both political and industrial, caused by the war, are bringing all sections of the country to a correct realization of the importance of a great merchant marine operating under the American flag, and the outlook is hopeful for an amelioration of our present harsh marine laws.

Offsetting our lack of a great merchant marine, a factor considerably

A Student of International Trade

SAMUEL A. BENNER, by experience and training, possesses that international outlook as a steel man, to which the world-wide movement in the industry of the past two and one-half years has given a new commercial value and importance. In addition to many years spent in executive sales positions in the United States, he has conducted negotiations in iron and steel in many foreign countries, including Great Britain, Russia, Turkey, Brazil, Argentina, Chile, Canada, Mexico and Cuba. Following his early years in the offices of the Carnegie Steel Co., Ltd., at Pittsburgh, he represented that company as a salesman in Montreal and in the City of Mexico. After the formation of the United States Steel Corporation in 1901, he was made manager of foreign sales for the Carnegie Steel Co. Successively he became head of the sales department of the International Nickel Co., general manager of sales of the Carnegie Steel Co., and assistant to the president of the Pittsburgh Steel Co. and of the Pittsburgh Steel Products Co. He investigated coal conditions abroad in 1914 in behalf of the Pittsburgh Coal Co. From June, 1916, to January, 1917, he represented the American Steel Export Co., New York, in a trip through Russia, Norway, Sweden, Great Britain and France. He is now general manager of sales of the American Steel Export Co. Mr. Benner's varied responsibilities long ago made him a student of fundamental iron and steel conditions throughout the world and of the problems of overseas merchandising from the standpoint of the American manufacturer.

in our favor will be the increased cost of all manufacture in Europe. This will be due to the much higher taxation that will be required to take care of the immense government loans caused by the war, the much higher rates of interest that will be caused by the scarcity of money, and the much higher level of labor rates that will undoubtedly prevail. On the face of it, everything in Europe after the war will cost much more than before the war. Great Britain now is collecting a primary income tax of 25 per cent of the net profits of all business. If this high rate of taxation continues after the war, as is very likely, a British steel plant, for example, that netted on an average before the war a profit of $10 per gross tons on its ingot production, which would be a conservative estimate, must pay an income tax of $2.50 per gross ton of ingots. Looking at the situation broadly, the great European district will probably find its ingot cost increased by $3 or more per gross ton. This increased cost will tend to make the great European district not so formidable a competitor in the non-producing markets as formerly.

For over two years, the United States has occupied the unique position of being the only country able to supply iron and steel for the international markets. In consequence, buyers abroad found it necessary to come to this country. These buyers bid for our steel, and the situation was so radically in our favor that we have been able to compel payment in this country for practically all of these purchases. This unusual situation will not much outlast the war. After the fighting has ceased, the great European district again will be in position to supply the overseas markets. The United States then must again meet its competition and must again accept payments abroad.

While the non-producing markets have been able during 1915 and 1916 to take only about 5,000,000 gross tons of the various finished forms of steel per annum, for the 10-year period prior to the war, from the best estimates available, they consumed yearly from 7,500,000 gross tons in a "bad" year to 15,000,000 gross tons in a "good" year. To supply this demand, the great European district used from 25 to 40 per cent of its capacity.

Due to our unique position, the United States is the only country that has been able to resume normal repair and extension construction. By the end of 1917 we will have had over two years of such work. All other countries, including the non-producing markets, are behind by several years with their repair and extension programs. To make up for lost time, we may expect an era of constructive activity after the declaration of peace, not only in Europe, but also in the non-producing markets. Iron and steel will be required, furthermore, to replenish stocks throughout the world, which today are practically non-existent.

What Peace Will Bring

When peace comes, bringing with it a cessation of the present enormous demand for steel for war purposes, prices will recede toward the normal and we may then expect the following:

1. Some demand from Europe itself for quick reconstruction purposes. This demand will not be proportionately great, nor for long.
2. Further constructive work in the United States.
3. Replenishment of stocks everywhere.
4. Abnormal constructive activity in Europe and the non-producing markets, to make up for lost time.

During 1916 and 1917 the United States will have consumed in domestic business approximately 31,000,000 to 32,000,000 gross tons of ingots per annum, making these two years the greatest in this respect in our history. While the large sums of money now being accumulated by the United States will continue to seek investment after the war, thus making comparatively easy the financing of new work, not only at home, but also abroad, it is extremely doubtful if we shall need in any one year for domestic consumption over 40,000,000 gross tons of ingot capacity per annum for the 5-year period after 1917. Such phenomenal domestic consumption still would leave unemployed 8,000,000 gross tons of ingot capacity per annum, or 6,000,000 gross tons of finished steel. A consumption at home of 32,000,000 gross tons per annum would leave unemployed 16,000,000 gross tons of ingot capacity, or 12,000,000 gross tons of finished steel.

Importance of Trade

As an estimate, we shall likely be glad to use 10,000,000 gross tons of capacity per annum for export in some form or other during the 5-year period beginning with 1918. If there should be a slackening at home in constructive work coincident with the cessation of the war demands, it will be difficult to operate comfortably without considerable business from the non-producing markets. This brings plainly before us the importance of such trade. Domestic demands may not be sufficient to employ a good percentage of capacity, and it is only prudent business strategy to make sure of getting as large a share of outside business as possible. The great European district will want from us only some materials that we can deliver quickly, and will call on us for such deliveries only until that district is again operating without restriction. We may expect the European makers then to reach out for the non-producing markets as vigorously as ever.

Obviously, one of the important problems now before the iron and steel trade of the United States is to perfect instrumentalities for getting and holding a very large share of the overseas non-producing markets. We began to export steel overseas in the late nineties. In general our policy has been aggressive only at times. Usually we simply have met competition from Europe. In consequence, our share of this business was comparatively modest. We shall probably find it necessary to change our tactics altogether, we setting the price that Europe must meet instead of Europe setting the prices that we must meet. Our own country was able to consume a very large proportion of our output, but with the 30 per cent increase in capacity that we shall have in 1918 as compared to 1914, the situation seems quite different.

The United States Steel Corporation, founded early in 1901, and ever since controlling about one-half of our total steel-making capacity, has made the only organized widespread effort for export trade. Prior to the war even it was content if 10 per cent to 15 per cent of its capacity was devoted to such business. The independents have made only spasmodic efforts to get foreign trade. A considerable percentage of our outside business has been with Canada, but this trade, due to the proximity of Canada to the United States, is really local business. Furthermore, it must not be forgotten that by Jan. 1, 1918, Canada will have increased its ingot capacity by almost 1,000,000 gross tons per annum, and therefore will be much more independent than before the war.

Many special problems are found in connection with foreign business which are somewhat different from those involved in domestic trade. Most of these, however, can be solved by the establishment at proper locations throughout the world of well equipped sales offices to bring us in close touch with the ultimate buyer. This is the first step in securing the business. We must go direct to the buyer instead of trusting that he will place himself in touch with us by some means or other. Without well organized means for obtaining inquiries, we cannot hope for many orders. Such offices provide permanent channels between the buyer and the maker, so that accurate information can be expeditiously transmitted from one to the other. By means of these channels most of the problems can be solved, as most of the troubles that arise are due to a lack of a clear understanding between the buyer and the maker. The United States Steel Corporation already possesses such sales offices abroad. The independents, however, should address themselves to the perfecting of connections

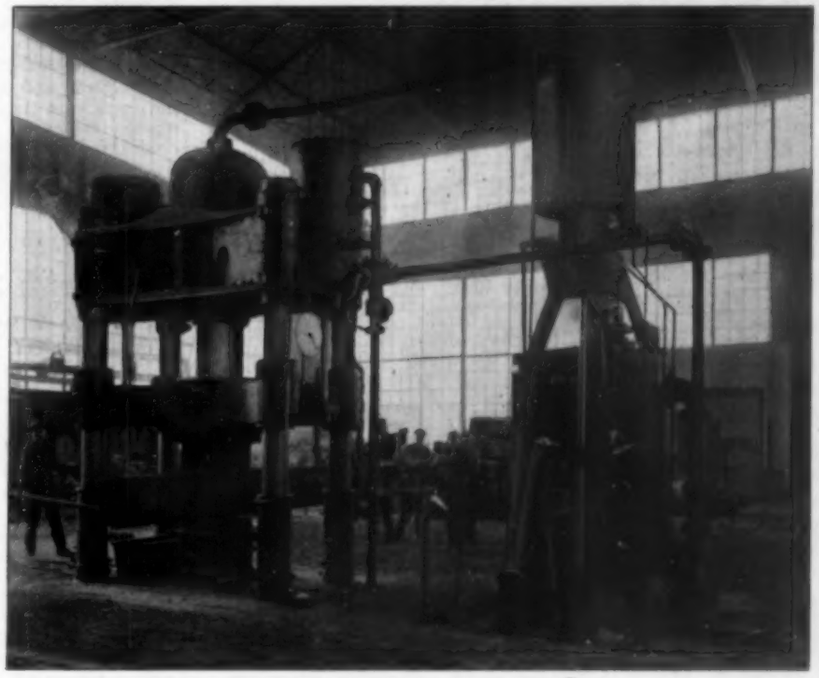
if they wish to obtain their share of the foreign trade.

The Webb bill failed of passage in the late congress. It may become law by the spring of next year, but even if such a bill does not pass, there still are other means by which the independents can engage largely in export trade. Our banking interests will help greatly in handling this foreign trade, as they are now providing financial branches in many of the non-producing countries. The details of export cannot be handled to advantage in the interior, but only at seaboard. For that reason practically all the successful export trade from the United States is managed in New York City. The many problems of international finance and transportation can be solved there better than elsewhere.

After a clear understanding as to what is to be supplied is reached, the holding of this overseas business very largely is dependent on a clear realization by all concerned of the profound difference between the movement of freight by ships and the movement of freight by railway cars. When space has been bought in a boat, and the material is not at the port on time so that the boat sails without the material, serious troubles are inevitable. Liberties, therefore, cannot be taken with promises to ship from works material destined for ocean transportation. In domestic or Canadian business requiring railway cars such troubles do not arise, as the shipper has not bought space in particular railway cars from a railway company. This striking difference between ocean and land freighting is well recognized by the United States Steel Corporation. In consequence, ocean export orders throughout all its constituent companies are taken care of *first* in all programs of operation. Some of the independents recognize this condition, but some of them do not. All of them must appreciate it successfully to hold foreign trade.

Builds Steam-Hydraulic Forging Press

THE Morgan Engineering Co., Alliance, O., has built hydraulic presses for a number of years and in the past two years has developed steam hydraulic forging presses, in varying sizes, and are now prepared to build presses up to 12,000 tons pressing capacity. The steam hydraulic rapid forging press, shown in the accompanying illustration is a practical and powerful tool for the production of solid homogeneous forgings of varying sizes from a small size die forging up to the larger sizes of shafts, etc. The press shown is of 800 tons capacity and is in operation in the new forge shop of the Morgan Engineering Co. It is used on shafts, connecting rods, locomotive axles, also for drop forging die work, crane hooks, chain links and bolts of standard make. The press plant consists of two units, the press itself, and the steam-operated intensifier carrying a prefiller tank. The press is operated by a single lever, and has an effective power stroke of 5½ inches. The total stroke of the press is 40 inches. The press can be operated with rapid short strokes as well as for longer strokes, and the movement of the crosshead with the upper die is at all times under the control of the operator by means of the controlling valve gear. This feature is essential for the production of accurate forgings. The press, as may be seen, consists chiefly of the base plate carrying the four columns and the die, which is wedged in, the crosshead with ram and upper die, also wedged in, and the top platen with the press cylinder, which also carries at each side the steam operated pull-back cylinders. The platen with the cylinder is a ribbed steel casting accurately bored and faced. The mouth of the cylinder is bronze lined and carries a U leather packing. The stuffing box gland contains an oil reservoir for continuous lubrication of the ram. The crosshead with the ram is a steel casting and carries the moving anvil or die. The ram is machined and polished its entire length. The base plate is a cast steel section bored and faced. The upper side is provided with a dovetailed rail for wedging the anvil or die. The columns are made of open hearth forged steel annealed, heat treated and machined over all. The construction of the pull back cylinder is similar to that generally used for steam engine work. The cylinder and piston are cast iron and the piston rod of open hearth steel. The steam-operated hydraulic intensifier which is operated under 125 to 150 pounds steam pressure consists chiefly of a cast iron cylinder, a cast iron top cover in which is securely mounted the open hearth forged steel high-pressure cylinder. The cylinder is equipped with a prefilling tank which is partly filled with water and under 70 to 80 pounds per square inch air pressure, which is supplied by a small size air compressor. The upper end of the high-pressure water cylinder is connected by means of extra heavy seamless drawn-steel tubing to the press cylinder. The piston of the intensifier is cast steel and provided with three cast iron packing rings. The piston rod which serves as a plunger for producing the high pressure of 6,000 pounds per square inch is made of special forged vanadium steel.



STEAM-HYDRAULIC RAPID FORGING PRESS

Russian Iron and Steel Syndicates

The Second Part of This Article Tells in Detail How Prices Are Fixed, Contracts Awarded and Fines Levied—Uniform Treatment of All Manufacturers is an Outstanding Feature

PAYMENTS for delivered syndicated goods will be made within the following periods: In the case of orders from private parties, not later than the fifteenth day of the second month following that of the date of the invoice; in the case of orders from the State, public institutions and railway lines, not later than the fifteenth day of the fourth month thus following. Such payments are made either in cash through a bank in Petrograd selected by the contractor, or at the syndicate's discretion in bills received from clients and endorsed by the syndicate.

In the case of any delay in the payments, due to the contractor for goods delivered, the syndicate will pay him interest on all amounts in arrears at the rate allowed by the State bank in discounting merchants' bills. Should such delays exceed three months, the contractor has the right to call upon the syndicate to hand over to him all the necessary papers to enable him to collect the debt himself, the syndicate remaining responsible to him for any delays in payment within the agreed terms. The contractor may make good his claim in the law courts and even retain any sums due from him to the syndicate against payments more than three months overdue to him.

Contractor Benefits by Water Transportation

When, with a view to reducing transport expenses, the contractor at the request of the syndicate or on his own initiative sends by water all or a part of the syndicated goods made by him, he receives a premium equal to 90 per cent of the savings, as compared with railway carriage or the combined transport expenses by rail and water, if such a way of sending the goods is equally practicable, from the works of another contractor of the same group with works nearest to the place of destination of the goods.

The syndicate has the right to have all the contractor's correspondence, business transactions, and books thoroughly examined by its agents with the exception of the books containing entries as to net costs. *Per contra*, the contractor has a reciprocal right to examine the syndicate's correspondence, business transactions, and business books. The syndicate has also the power to send its agents to the contractor's works to control the whole of the manufacture of syndicate goods, and also to check all his stocks of such goods. Should the contractor not allow the syndicate's representatives full liberty in carrying out their mission, the syndicate would be at liberty to assume all the information in its possession and contained in writings issued by the syndicate within a given period to be correct, and the contractor would have no right to contest its accuracy.

Financing the Syndicate

As a remuneration for its work, and the reimbursement of expenses incurred through the sale of syndicated goods made by the contractor, the latter allows the syndicate from 1½ to 2 per cent—according to the syndicate's estimation, but such percentage to be the same for all contractors — on all net amounts due for deliveries made by him. Statements showing the exact amounts due to the syndicate are prepared every half year, but payments on account must be made by the contractor at the end of every month on the values of all goods delivered by him during the given month. All sums due to the syndicate for commission may be deducted by the latter from payments due to the contractor. Any balance due to the syndicate must be paid by the contractor not later than three weeks after the presentation of the account.

The contractor undertakes to send the syndicate the undermentioned returns on forms drawn up by the latter:

(*a*) Every 10 days of each month, and not later than six days after the termination of each term: (1) The state of progress of all contracts received by him before joining the syndicate. (2) The state of progress of all direct orders.

(*b*) Every month not later than the tenth day of the following month in addition to the returns under items (1) and (2) as above. (3) A statement of the payments on account of unfinished contracts.

In every case of delay on the part of the contractor to send in such returns by the specified time he has to pay the syndicate a fine of one rouble (51.5c) for every day in arrear and for every document or item for which the desired information has not been supplied.

In the case of a delay in sending invoices or copies thereof the contractor has to pay the syndicate a fine of 20 kopecks (about 10c) per day for each invoice or each copy not sent.

On the other hand, the syndicate undertakes to supply the following returns to the contractor on forms agreed upon by the general meeting:

(*a*) At the end of each half year the computation of the general average base prices and balance sheets of payments due to the contractor from the syndicate, or *vice versa*.

(*b*) Every month: (1) the computation of the individual average prices fixed on the first day of that month; (2) detailed statements as regards the state of allotments due to the contractor as his share and to other contractors as their shares, as fixed on the first day of each month.

(*c*) At least three times a week a statement showing the excesses or deficiencies in the allotments of the contractor for each category and class of goods separately.

(*d*) Over and above the above papers the syndicate must send to the contractor copies of the minutes of proceedings of all general meetings of contractors within three days after the signatures of all those present at the meeting have been appended to such minutes.

Sale of Works

The sale or subletting of works, or any part thereof, belonging to the contractor, wherein syndicated products are made, can only be authorized under the following conditions:

(*a*) The agreement with the syndicate is to remain in force in its entirety as far as the contractor is concerned if the whole of the works or a part thereof is sold or sublet to another party.

(*b*) As soon as all necessary formalities for the sale or subletting of the property in question have been gone through, the new owner or tenant has to confirm by letter to the syndicate that he jointly and severally with the contractor takes upon himself the full responsibility and obligations under the agreement. If the contractor sells or sublets the works without obtaining such a declaration from the new owner or tenant, he is liable to a fine of 100,000 roubles ($51,500) to the syndicate without being released thereby from any of his obligations under the agreement.

If the contractor sells or sublets a part of his works in which syndicated products are not made but only worked up into other products, or if he sells the iron mines or colliery belonging to his works, he loses the right accorded to him in his agreement to deliver to such undertakings syndicated products with-

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out these being entered against his allotment.

The agreement with a contractor remains in force and binds the contractor even in the case of a receiver being appointed by a court of law to administer his business.

All agreements are generally made as from Jan. 1 to Dec. 31. At the expiration of an agreement all obligations undertaken by both parties continue in force in respect of all orders transmitted to the contractor under his agreement but not yet finished, and all accounts continue to be carried on until every order under the agreement is completed and all mutual accounts in connection with such orders are closed.

The agreement lapses if the syndicate passes into a receiver's hands, or becomes bankrupt or ceases to act.

Collecting the Penalties

In order to insure the payment of fines and penalties specified in the agreement, and of other sums which may become due to the syndicate, the contractor deposits in the safe of the syndicate at the time of signing this agreement 50,000 roubles (about $25,750) in cash, government securities or in bills endorsed by him. The syndicate has the power to apply to a court of law to recover sums due to it from the contractor or to appropriate the cash or to sell the securities or bills deposited by him, or to retain equivalent sums from payments due to him. In every such case he has to replace the whole or make up the difference of the deposit within a fortnight after receiving notice from the syndicate. In the case of a sale of government securities or private bills the syndicate does not undertake the responsibility for making up any deficiency due to any loss through the sale. If the contractor wishes to deposit his own private bills he undertakes to remove them a fortnight before they become due in every case.

The stamp duty on the agreement has to be paid by the contractor.

The contractor has to acquire his shares in the Prodameta at the nominal price of 250 roubles (about $129) each. If the agreement is cancelled, or is not renewed for another term, the contractor is bound to sell his shares to the syndicate at the same nominal price. In case of refusal the syndicate may enforce the re-sale in a court of law.

All disputes between the two contracting parties are settled by a general meeting of all the shareholders, or by legal arbitration or, if neither of these courses be accepted, by the law courts of the city of Petrograd.

The agreement for the supply of rails is much shorter than the one for rolled joists and channels, and extends to merely 39 clauses. A striking difference from the other agreement is that in describing the area of the activity of the syndicate it specially mentions the grand duchy of Finland and the provinces of Khiva and Bokhara. The "syndicated goods" in this case include all rails, weighing 45 pounds or more per yard, of every description, section and length, both of iron and steel made by any process whatsoever and of any quality. The rails are divided into seven categories, each category being known by the letter of the alphabet under which it is enumerated in the agreement as per subjoined list, the first four categories being all rails for railway or other purposes and of first quality.

(*a*) Rails of first quality of every description except those mentioned in the next three items; (*b*) Vignoles rails for points and crossings; (*c*) "Williams" rails for points and crossings; (*d*) "Phoenix" rails of first quality, with fishplates for railways; (*e*) "Phoenix" rails of second quality, that is rails discarded by the contractor or rejected by the purchaser; (*f*) rails of every kind (except "Phoenix" rails) discarded by the contractor or rejected by an inspecting engineer of the Russian railways, as well as all rails taken out of the road and returned to the contractor as not having satisfied the latter's guarantee; (*g*) rails of second quality for shipments abroad.

After signing the agreement the contractor has to send the syndicate a signed copy of the book of rail sections rolled by him. For the rails in categories (*a*), (*b*) and (*c*) the book must contain every section of rail as used at present by the railways in Russia, Finland, Khiva and Bokhara. New types or sections that may subsequently be introduced must be added to his list within eight weeks. Both obligations apply also to the Phoenix rails.

Penalties for Selling

The penalties for selling or even rolling rails without the intervention of the syndicate are the same as in the case of rolled joists, etc., that is, 10,000 roubles and one rouble per pood. All tonnages thus sold are deducted from the contractor's share as if the order had been received through the syndicate. On the other hand, if the syndicate for some reason or other should consider it necessary that the contractor should secure a direct order for rails, he has to use every endeavor to secure such order, but without infringing any clause in his agreement, as otherwise he will have to pay the syndicate a fine of 25,000 roubles ($12,900), and all other fines incurred under other clauses in his agreement.

The contractor may sell direct to a customer if the rails are intended for export abroad, with certain exceptions presently to be mentioned. At the same time he has to keep the syndicate informed of all such sales, and the tonnages will not be considered as forming part of the share to which he is entitled under his agreement with the syndicate. The exceptions are rails sold for the Eastern Railway of China, and rails sold abroad for the Russian government or to countries outside the Russian empire but under Russian protection.

Delivery of Rails

Clause 6 in the case of the agreement for the delivery of rails is totally different from the corresponding clause for rolled joists. In the case of the former a special committee is appointed to examine into all questions relating to base price, terms of sale, and extra charges. The same committee has to look also into every individual case when the syndicate has to force a contractor to enter into direct negotiations with a purchaser, and offer rails for sale to such a purchaser, or when the syndicate has to purchase rails from works outside the combine or has to call upon a contractor to make applications to a government department. All contractors for rails are represented on this committee and have a number of votes varying with each category of rails and in proportion to each contractor's allotment in such category. The syndicate's special representative takes part in the proceedings of the committee and has 14 votes. To pass a valid resolution, at least five contractors and the syndicate's special representative must be present. The majority of votes decides, and resolutions thus passed are binding both for the contractor and the syndicate, unless they clash with some provision in the agreement. Every breach of a resolution thus voted will render the contractor liable to a fine of 25,000 roubles ($12,900), payable to the syndicate over and above any other fines incurred under the agreement.

All orders for rails are to be carried out by the contractor within the term specified by the syndicate, such terms being dependent on the total tonnage due to the contractor as his allotment and the tonnage already supplied by him. In the case of government orders the time of delivery will be determined by the day on which the rails are submitted to the government inspector; for rails not inspected at the works, by the day on which they leave the works. Should the contractor refuse an order, or not be able to give delivery in the desired time, or be behind with the execution of an order without the consent of the purchaser more than four weeks after the extension allowed to him, all such orders will be cancelled by the syndicate; but all the tonnages in such orders are booked against his allotment, as if they had been carried out. Stoppages at his works are to be announced to the

syndicate by telegrams or registered letter, and all orders which during the periods of such stoppages would have gone to him will be considered and treated as orders refused by him.

The general average base prices for rails are fixed on Jan. 1 and July 1 of each year on the basis of all invoices received by a fixed date.

In the case of any works outside the combine wishing to join, at least two-thirds of the votes (as represented by the tonnage of the allotments) of the works represented in category (*a*) must be in favor of such admission.

Rails used by a contractor in making or repairing his own private sidings will not be counted as part of the share due to him, unless such sidings are subsequently sold or ceded to another party.

All rails the contractor may have to purchase from another firm must be obtained through the syndicate, but such rails can only be used for his own private purposes and must on no account be sold to another party.

Should the syndicate not place sufficient orders with the contractor by the end of December of the year to make up his allotment, he is entitled to indemnities at the following rates: (1) 30 kopecks per pood (about $5.60 per ton) for rails in (*a*) and (*c*) categories; (2) 15 kopecks (about $4.80 per ton) for rails in (*b*) category; (3) 35 kopecks ($7.10) for (*d*) rails; and 10 kopecks ($3.20) for (*e*), (*f*) and (*g*) rails. The tonnages for which such indemnities are paid are considered to form part of his allotment. If, on the other hand, the contractor should receive an excess of orders by Dec. 31, he will have to pay indemnities on the same scale to the syndicate. All indemnities must be paid within a month.

All rails rejected by the works, also lengths not exceeding 6 feet in length, and rails 6 feet long holed or milled at one end are considered scrap, and may be sold direct by the contractor at a price fixed by him, but only to other steel works for the purpose of re-melting.

The contractor may not exchange orders with other contractors in respect of his whole or part of his allotments except with the consent of the syndicate, and only for rails in categories (*a*), (*b*) and (*c*); in no case for rails in the other categories.

Should a contract with a private railway company or the State railways include a clause to the effect that a certain quantity of rails over and above the tonnage in the order are to be supplied with a guarantee for wear for a certain fixed period, such rails must be supplied by the contractor entirely at his own risk, and will be treated as a direct order and not as one received through the syndicate, provided the tonnage of such guaranteed rails does not exceed 1 per cent of the order. He has to replace all rails, pound for pound, and free of cost, which may not have stood the guaranteed time test as regards wear. The contractor is held responsible also for all rails damaged while at his works, and for their replacement if a purchaser insists upon it. The syndicate accepts all orders as the authorized agent for the contractor, and must pass them on to him at the price arranged with the purchaser, whose name is to be disclosed to him in every case. On the other hand, the contractor's name must be set out on all invoices sent by the syndicate to purchasers.

All the rules as to confirmation of orders, headings of letter-papers, invoices, number of copies, accounts, and all other matters are practically the same as in the case of the agreement for rolled joists.

The syndicate's commission in this case, however, is 1.8 per cent on all rails supplied to State and private railways and 1.0 per cent on all other deliveries. The amount of securities to be deposited by the contractor with the syndicate is 50,000 roubles (about $25,750) as in the other case.

Transfer of Shares

The contractor undertakes not to transfer or sell any of his shares in the syndicate to a third party without the consent of the syndicate, or to pay a fine of 1,000 roubles ($515) to the syndicate for every share sold or transferred. In the case of any shares in the syndicate being offered to him for sale, the contractor must acquire these at the price at which the shares are valued in the syndicate's books. The shares for sale will be distributed among the shareholders in proportion to their allotments. On the other hand, should it, with the entry of a new member into the syndicate, become necessary to allot shares to such a new member, the contractor agrees to part with a number of his shares as directed by the syndicate, in accordance with the new distribution at the price indicated above.

The agreement for the sale of merchant iron and steel includes the following products:

I.—Hoop iron and steel, divided into three classes.

II.—Iron and steel tires, divided into three classes.

III.—Merchant iron and steel (including tool steel), bars of every kind, quality, size and section, divided into four classes.

IV.—Iron and steel rails, weighing about 26½ pounds per yard or less; one class only.

V.—Crop ends and second quality products of all the above four categories.

The syndicated goods in this case include also wire-rods and wire, with some exceptions, rolled or forged billets, 2 inches thick or less, and sheet bars, if these are intended for rolling roofing sheets or sheets for making shovels and are of a certain width and do not exceed a certain length.

The roofing-sheet industry is peculiar to Russia. Most buildings in the Empire, from the large mansions in the towns down to the peasant's modest cottage, are covered with sheet iron, involving the production of a considerable tonnage of the commodity. The output of 1913 totaled 415,000 tons. It is said that their manufacture was inaugurated more than 200 years ago by Peter the Great in the Ural districts, and quickly attained high perfection. The problem is to produce iron sheets which are not easily liable to be attacked by rust, and this has been solved from the beginning by the ironworks in the Urals in the form of a special treatment which, upon the whole, consists in beating the piled-up sheets while at a dull red heat and sprinkling between them powdered charcoal. This produces a bluish protective coating of oxide, which penetrates into the sheets and efficiently protects the iron from rust. The use of charcoal—that is, a fuel free from sulphur—in making the puddled iron, in itself tends to produce a metal which is not so readily attacked by rust.

The ironworks which were established in the south of Russia in the nineties became, for a time, formidable competitors of the Ural roofing-sheet industry. They use coke in producing their iron, and omitted, at first, the subsequent treatment of the sheets, urging that painting them, as is generally done in every case, is in itself sufficient protection against rust. The sheets could thus be produced at a cheaper rate, and quickly found their way into the market owing to the lower price at which they could be offered; but a few years' experience soon proved that the southern ware was inferior to the article produced in the Urals. Carefully made and properly painted sheets from the latter source will last 10, 15, or even 20 years, while the southern article's average life is only about three years. There are said to be specimens of sheets from the Ural works in existence which are about 200 years old. The south Russian ironworks were and are unable to procure charcoal at a reasonable price, and are therefore obliged to continue to use coke in making their iron, but they all have gradually adopted the after-treatment of the sheets as practiced in the Urals.

The sheets are sold by the weight in bundles weighing 5 poods (about 180 pounds) each, the number in a bundle varying with the gauge of the sheets. Their standard size is 1 x 2 arshines (2 feet 4 inches x 4 feet 8 inches). The sheets for which there is the greatest demand are those of which 20 go to

the 5-pood bundle and are about ½ millimeter thick. (No. 25 I.S.W.G.).

Owing to the severe frosts prevailing in winter, building operations have to cease during that season in Russia, and consequently the great bulk of roofing sheets must be delivered in the course of the spring and summer months. Those from the works in the Urals are distributed over the Empire via the two great rivers, the Kama and Volga. All sheets produced during the frosty season must therefore be stored until the opening of the navigation (about May), and must then be quickly forwarded to reach the market centers at certain inland ports and railway distributing centers, because the sheets are mostly sold retail direct to the small consumers, and deliveries must be completed before the following cold season. Hence the despatching of the sheets made since the previous autumn must be arranged with great foresight with the advent of spring, and if at about midsummer there should be a great rush for sheets, and the available stocks get low, all the ironworks must do their utmost to increase their output in order to meet, and take advantage of, the momentary enhanced demand. This in its turn requires careful marshaling of the stocks of fuel for iron-making, especially in the Ural districts, and this a long time in advance, because timber can only be felled in the autumn and charcoal must be burned in winter. As will be seen, all conditions for the manufacture and sale of these sheets have favored, if not called for, a powerful central organization, and the result was the formation of a large combine or syndicate, which is known as the Krovlya.

The aggregate tonnage of roofing sheets produced in the whole Russian Empire, and the percentages contributed to the total output by the works in the Ural districts and those of southern Russia between 1905 and 1913 are shown in the following table:

		Percentages contributed by the works in		
Year.	Total output in Russia. Tons.	Urals. Per cent.	South Russia. Per cent.	Other districts. Per cent.
1905.....	220,000	81	10	9
1909.....	340,000	71	23	6
1913.....	415,000	58.5	28.5	13

From these figures it is clear that the ironworks outside the Ural districts are gradually gaining a stronger footing in the market, owing to which the Krovlya no longer occupies the dominant position it held some years ago.

There are two forms of agreement between this syndicate and the works belonging to the combine, but it will suffice to give particulars of the more recent form. According to this, the agreement covers all sales within the boundaries of the Empire of Russia and Finland, including all deliveries to the Russian government and "Russian railways abroad." The syndicate is the sole selling agent for all roof sheeting produced by all the convenanting works (the contractors), and no contractor is allowed to use any sheets except for repairs, etc., in his own works, or sell them to anybody (except to customers abroad), not even sheets bought outside the syndicate, for his own purpose, nor must he in any way help or mediate in such sales. Notice is to be sent by him to the syndicate of all sales of every kind in his monthly returns.

The term "roofing sheets" includes all sheets used for roofs or other structural purposes or works, provided they comply with one or the other of the following conditions:

(*a*) Rectangular sheets of a thickness corresponding to the weight of 10 Russian pounds (about 9 English pounds) per square arshine (about 5½ square feet), that is, No. 20 Birmingham wire gage thick or of less thickness, one-half arshine (1 foot 2 inches) wide or more, and ¾ of an arshine (1 foot 9 inches) long or more.

(*b*) All sheets cut to special patterns and waste due to cutting of sheets mentioned under item (*a*), if such cuttings have an area of (about) 2 square feet and more.

The exceptions are finished or semi-finished black sheets not suitable for roof work, such as cold-rolled sheets, and pickled sheets, that is, sheets prepared for being coated with another metal, but not galvanized sheets, which the contractor is allowed to finish himself or have galvanized at some other establishment, but the tonnage of such galvanized sheets, except in special cases mentioned in the agreement, is to be reckoned as part of his allotment, and a return of the aggregate tonnage of such sheets sold by him must be sent to the syndicate on Aug. 1 every year. The deduction allowed for spelter is 12 pounds from every 100 pounds of galvanized sheets. The contractor has also to give notice to the syndicate by Sept. 1 of each year of every sale of semi-finished products, such as billets and "red" (that is, untreated) sheets, and the tonnages included in all such sales are deducted from his allotment at the rate of 2 tons of semi-product for every ton of finished product allotted to him as his share under the agreement. There are several other clauses with reference to the sale of semi-products, and there can be very few loopholes left for the manufacturer to save the commission to be paid to the syndicate.

The base price for sheets of every kind is the one fixed for untreated sheets of coke iron as manufactured in the works in south Russia. Additions to such base price are allowed for the following:

(*a*) For heating, beating, and sprinkling with powdered charcoal red sheets in accordance with the Ural practice.

(*b*) For sheets made of charcoal iron.

(*c*) For sheets specified to be of certain brands.

(*d*) For sheets of first and second qualities of the old Ural brand as made by the Alapayev and the Demidov Iron Works.

Most of the other clauses are formulated on the same lines as those of the Prodameta syndicate.

Makes Large Corrugated Mold

The largest octagonal corrugated mold ever made in this country was cast successfully in the steel foundry of the Bethlehem Steel Co., South Bethlehem, Pa., on March 30. The mold is 15 feet 7 inches in height and has a mean diameter of 91½ inches. At the thinnest section, or point of corrugation, the thickness of the metal is 15 inches, while the thickness of the heaviest section is 20¾ inches. Owing to the necessity of pouring this casting very quickly, it was made in the steel foundry rather than in the iron foundry. After preparing the mold, which required four weeks, standard bessemer iron, melted in three open hearth furnaces, was poured into ladles which were suspended over the mold simultaneously, and a continuous runner from these ladles was constructed, so that the iron was thoroughly mixed before entering the mold. The metal originally charged into the furnaces amounted to 340,000 pounds and after the mold had been filled, an additional 10,000 pounds were brought from the iron foundry, situated three-quarters of a mile away, to pour into the sinkhead to feed up the shrinkage. The added metal was filled in about a ton at a time for three hours, when the shrinkage stopped; the metal, however, remaining liquid five hours after the mold was poured. The mold is to be left covered for some time, after which the sand and brick will be removed from it, and two large 100-ton cranes will be used to lift it from the pit to prepare it for shipment to the open hearth department. The mold is to be used in making the tubes and jackets for large-sized guns. Before the mold can be used, large steel bands, 8 x 12 inches, must be shrunk around each end of the casting.

The deficit on French railways for 1916, according to *L'Exportateur Francais*, amounted to $73,360,000. In order to meet this the French public is being urged to consent to an increase in the railway rates.

Reducing Cost of Ingot Molds

Recent Advances in Practice Include a Collapsible Core and Hinged Cheek Flask Which Play Important Part in Novel Molding Method—Stripping and Shaking-Out Operations Simplified

ON A par with the record-breaking steel production of the past 18 months has been the pressure on ingot mold foundries for castings. Many of these plants are allied departments of steel works, although it is estimated that more than 65 per cent of this tonnage is made in outside shops. Most of the ingot molds are poured from metal received direct from contiguous blast furnaces and in some instances these plants have a sufficient capacity to take the entire output from one or two stacks. A number of ingot mold shops remelt the iron in cupolas, this practice prevailing when it is impossible to obtain direct metal and when the direct metal is unsuited for these castings.

In the production of these bulky sections which aggregate a considerable percentage of the country's foundry production, the labor cost has been unusually high and every improvement in practice introduced in recent years has been directed toward the elimination of manual operations. Making cores for these large castings is a time-consuming operation and ramming the sand for the molds, in spite of the use of mechanically-driven rammers, is a back-breaking operation not favored particularly by molders, handy-men or laborers.

Recent Advances in Practice

Several years ago a collapsible core for ingot molds was introduced which greatly facilitates the shaking-out of the castings and also the production of the core. With probably only one exception, the molds continue to be rammed by hand, due to the difficulties experienced in ramming them by machine.

In connection with its Ensley blast furnaces, steel works and rolling mills, the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., operates a gray iron and steel foundry, the principal output of which, from a tonnage standpoint, consists of ingot molds. For a number of years these have been successfully rammed on a jar-ramming machine of the Mumford type, and this initial labor-saving operation was the forerunner of other experiments that had for their ultimate goal the production of the mold and core in one operation and the construction of all of the parts of the apparatus so that a crane or hoist can be employed in handling them. The only manual labor incident to the making of the mold and core and the shaking-out of the castings, involves the shoveling of the sand into the flask, and if sufficient headroom were available in this foundry, this operation could be eliminated by the installation of a sand chute.

The process was developed by J. B. Walker, superintendent of the pattern-shop of the Tennessee company

FIG. 1—LOWERING THE PATTERN OVER THE COLLAPSIBLE CORE ARBOR AND STOOL ON THE JAR-RAMMING MACHINE

FIG. 2—THE CAST STEEL CHEEK FLASK IN POSITION ON THE STOOL OR DRAG WITH THE STRIPPING PLATE BETWEEN

and involves the making of the mold and core in one operation on a molding machine of the jar or jolt-ramming type; the use of a collapsible core, special hinged flask, core arbor and stool, stripping plate and a hinged pattern which expands automatically thereby stripping freely from the sand core when lifted by a crane.

Sequence of Operation

Before describing the apparatus in detail, the sequence of operation entailed in assembling the flask, drawing the pattern, finishing and closing the mold, pouring and shaking-out will be presented. In the accompanying illustrations, the 40,000-pound jar-ramming machine is shown in Figs. 1 and 2. The core arbor and stool, with pattern being lowered into position, are illustrated in Fig. 1. On the parting surface of the stool is shown the stripping and lifting plate, *A*, which is centered by pins passing through holes in diagonal sides of the stool. The core arbor and stool constitute the drag section of the flask. The pattern is hinged at the top, being split across diagonal corners, as at *B*, thereby leaving it free to expand when it is being lifted off the core by a crane or hoist. The cheek section of the flask is shown lowered onto the drag or stool, in Fig. 2. The stripping plate is clamped to the cheek on two opposite sides, while the cheek is clamped to the stool, on the remaining two sides. The cheek flask consists of two parts hinged at the top. The bearing surfaces of the halves are brought together by the rope sling on the crane which loops over lugs or trunnions, *A*, Fig. 2, located on either side of the flask. When brought together by the crane, the two halves are locked by U-shaped clamps, *B*, Fig. 2. The lugs, *C*, two on each half of the cheek flask, are engaged by the crane sling when shaking-out the casting, Fig. 5, to effect the spreading of the two halves of the cheek and bolt, *D*, Fig. 2, has been provided to limit the distance of opening.

FIG. 3 — THE INGOT MOLD POURED AND READY TO BE SHAKEN-OUT

Collapsible Core

The pattern is centered on the stool by the stripping plate and it is prevented from spreading by the bank of sand which packs around it after the initial jar-ramming operation. Before sand is filled into the flask, the collapsible core is expanded by a key at the top. Sand continues to be shoveled into the flask throughout the ramming operation on the machine, which consumes from 10 to 12 minutes. After the mold and core are rammed, sand is shoveled out of the mold top on two sides and the two loose parts of the pattern which make the ingot mold lugs are attached to the pattern body by a tongue and groove, and the sand is packed around them by hand. One of the difficulties heretofore experienced in making ingot molds on a jar-ramming machine has been the inability to properly pack the

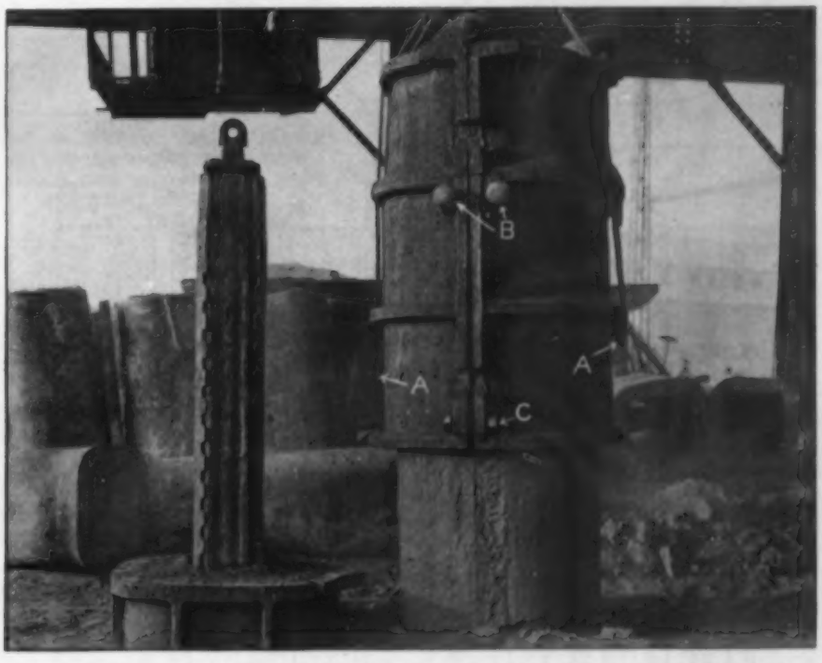


FIG. 4 (At the Left)—AFTER COLLAPSING THE CORE ARBOR, THE CHEEK FLASK CONTAINING THE CASTING IS LIFTED OFF BY CRANE—FIG. 5—THE HINGED CHEEK FLASK HAVING BEEN EXPANDED, IS READILY LIFTED OFF

sand around these parts of the pattern. The sand underneath the lugs invariably was soft and rammed-off, causing an imperfect coating. However, by inserting the pattern lugs after the ramming operation has been completed, the sand underneath the surface of the lugs is of the proper density and all previous difficulties have been overcome. The runner, which is a 3-inch steel bar, is withdrawn by the crane before the flask is removed from the machine table.

Casting Pit Operation

From the jar-ramming table the mold is transferred to the casting pit by crane where the pattern is drawn and the cheek and core are skin-dried and sprayed with blacking, after which they are assembled for pouring. After removing the clamps which hold the cheek and the drag, the cheek is stripped over the pattern which is held down by a special device to overcome the great pressure of so large a body of sand on such an extensive pattern area. In the meantime the stripping plate continues to be clamped to the cheek, but when the cheek part of the mold is stripped from the pattern, the latter being hinged at the top is free to expand at the bottom and it opens at two diagonal corners. The pattern is next drawn from the core by the crane. In the meantime another stool and core arbor have been placed on the table of the jar-ramming machine and the pattern is lowered into position for preparing another mold. Whatever finishings on the cheek and core are necessary are performed in the pit, after which they are sprayed with blacking and skin-dried. The drying continues for a period of about 12 hours and before the mold is assembled and closed, the stripping plate is removed. A gate, 3 inches in diameter, is cut at the bottom of the runner by the molder who does the finishing. A pouring basin is set on top of the mold, the metal entering through one gate only, at the bottom.

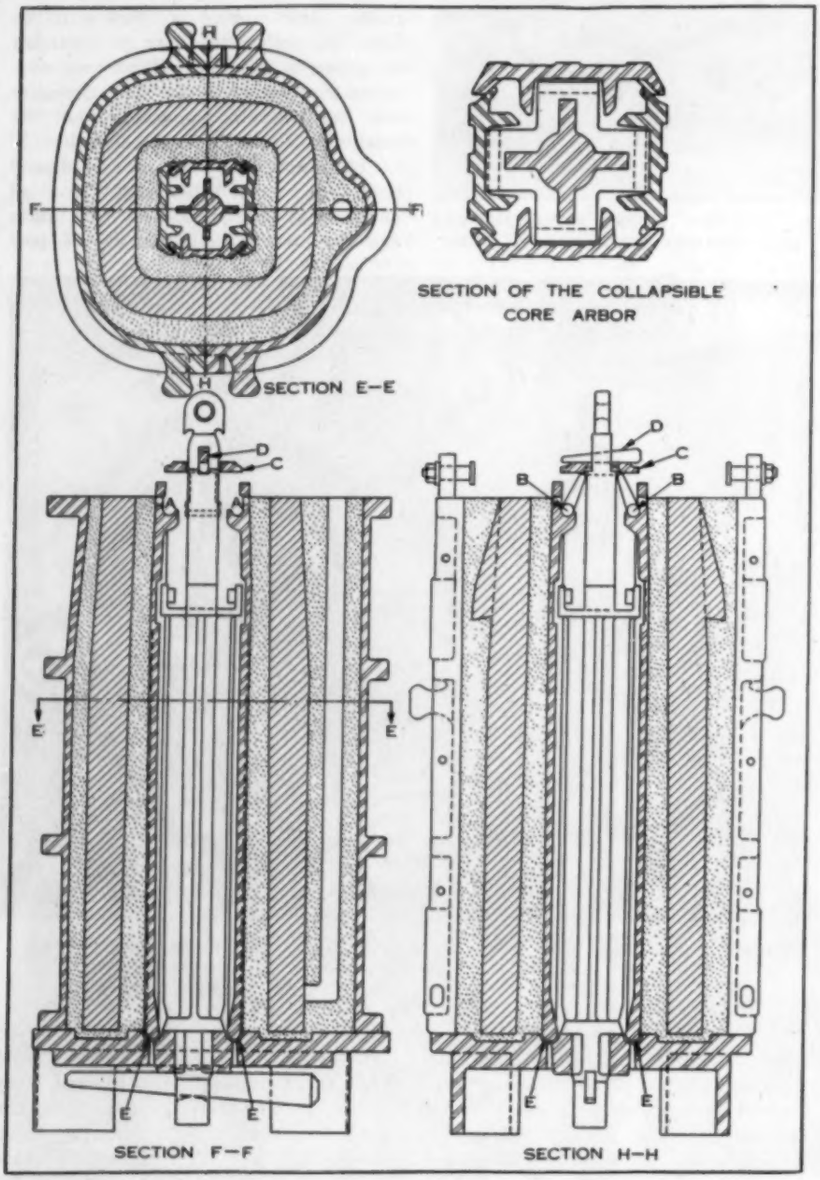


FIG. 6—HORIZONTAL AND VERTICAL SECTIONS OF THE ASSEMBLED APPARATUS AND HORIZONTAL SECTION OF THE COLLAPSIBLE CORE ARBOR

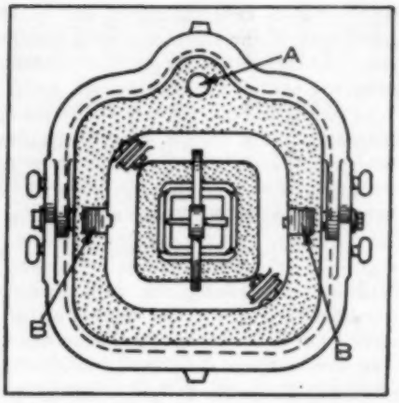


FIG. 7—TOP PLAN VIEW OF THE ASSEMBLED APPARATUS

Shaking-Out

After the mold has been poured, it is conveyed by crane from the pit to the shaking-out floor, Fig. 3. The rope slings on the crane pass over the trunnion lugs on either side of the flask, Fig. 4, which shows the first step in the shaking-out operation. Prior to removing the cheek flask, the key at the top of the core arbor by which it was expanded, was punched out, thereby permitting the arbor to collapse and making it possible to lift the cheek from the arbor. In Fig. 5, the arbor collapsed and the stool are shown at the left. At the right the cheek flask is being stripped from the casting, leaving the sand adhering to the outside of the ingot mold, the same as the sand of the core remains inside of the mold when stripped over the core arbor. By permitting the casting to remain surrounded with the core and molding sand until it cools, it becomes thoroughly annealed, which has been found to be a particularly desirable operation for ingot molds, materially increasing their period of usefulness.

When stripping the hinged cheek flasks from the mold, the crane sling engages the opening lugs at *A*, Fig. 5, *B* being the closing lugs or trunnions. The U-shaped clamps previously have been removed and

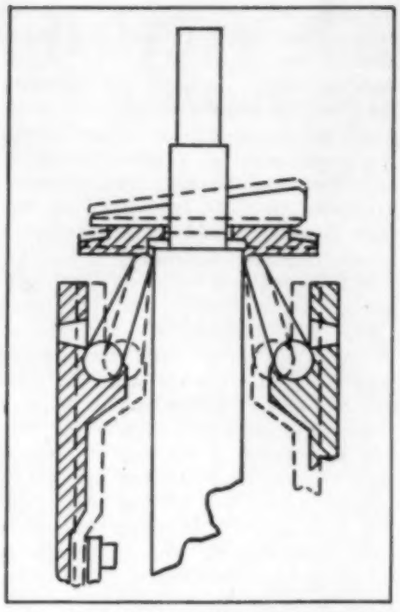


FIG. 8—DETAIL OF THE TOP OF THE EXPANSIBLE CORE ARBOR

the lateral action of the slings permit the flask to open the distance provided by the bolt *C*.

In Fig. 6 are shown vertical and horizontal sections of the assembled apparatus, with a section through the core arbor. The arbor is formed by four collapsible staves which carry at their upper ends internal socket bearings, *A*, Fig. 6, in which pawls, *B*, are mounted free to rock, being disposed upwardly so as to engage the column of the arbor at a point above the top of the staves. The staves have lapping corner joints, as illustrated in the section of the arbor, Fig. 6, and their construction also is clearly shown in Fig. 12. The staves are expanded by the action of the plate, *C*, and the wedge key, *D*, on the column, which engages the pawls and forces the staves outwardly until arrested by the engagement of the lugs on the staves with stop lugs on the column. At their lower ends, the staves are mounted to rock in the sockets, *E*, on the stool drag. The stool is recessed in its upper face to form the drag portion of the mold.

An elevation of the flask broken away to show the edge of the pattern and illustrating the sand band for holding it contracted during the ramming operation, is illustrated in Fig. 9. The pattern is divided diagonally in a vertical plane and each section carries about its top a protecting plate with upturned, perforated lugs at each end, arranged to overhang so that their holes, when in register, will lie in the plane of parting between the pattern sections. Between each pair of lugs is interposed a hanger plate which is on the same bolt that pivotally connects the lugs. The upper ends of these plates have holes to receive the hooks of the crane. The two holes of the pattern are centered by dowel pins and the expanding movement of the two sections is limited by an ingenious arrangement of hooks at *A*, Fig. 9, and shown in detail in Fig. 11. The encircling sand band is to hold the pattern contracted, as illustrated at *B*, Fig. 9. When ramming a mold, sand first is shoveled between the pattern and the flask to a height of about a foot. The table is given three or four jolts which compact the sand around the pattern and force and hold together the free ends of the section.

Fig. 7 is a top plan of the assembled apparatus showing the gate at *A* and the detached lug patterns at *B*. As stated previously, it is practically impossible to pack the sand around these lugs by the jolting or jarring process, and this mold and core are rammed before the ingot mold lugs are attached to the pattern. The operator removes the packed sand from the top of the pattern when the lugs are to be attached and inserts the lug patterns into vertical slots in the pattern which engage tongues in the lugs. The lug patterns are stripped off with the cheek and are drawn as a part of the finishing operation. A review of the device used

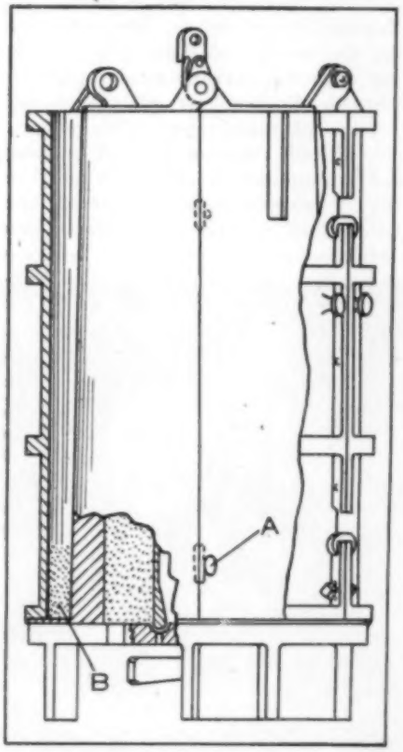


FIG. 9 — ELEVATION OF THE FLASK BROKEN AWAY TO SHOW EDGE OF PATTERN AND SAND BAND FOR HOLDING IT CONTRACTED

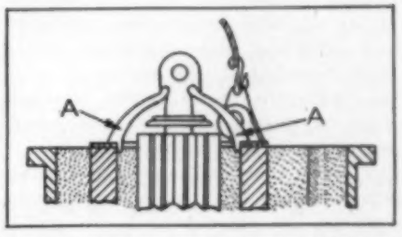


FIG. 10—DETAIL VIEW OF THE APPARATUS FOR HOLDING DOWN THE PATTERN AND THE METHOD OF APPLYING THE CRANE HOOKS TO THE PATTERN

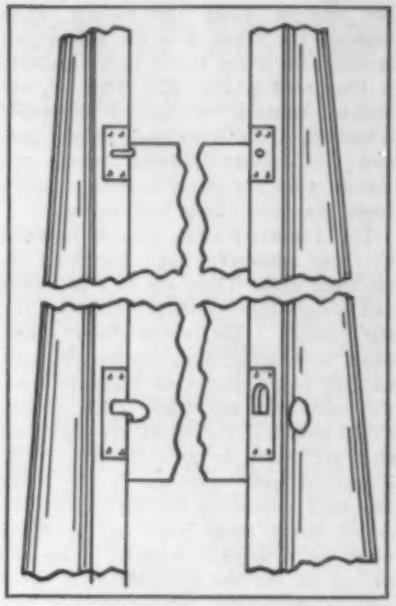


FIG. 11—DETAIL OF THE PATTERN DOWELS AND HOOKS

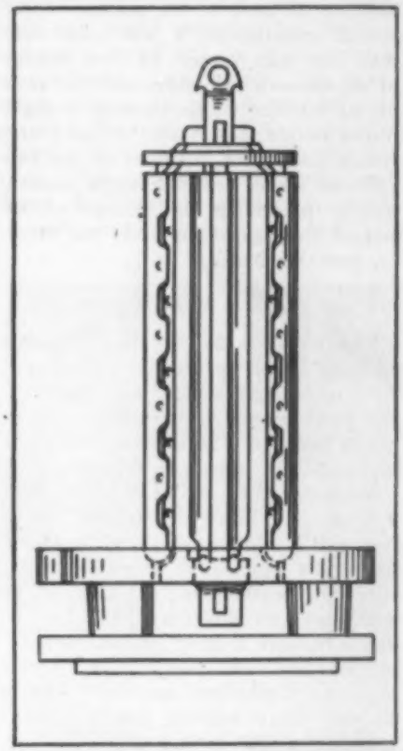


FIG. 12—THE CORE ARBOR SHOWING THE CONSTRUCTION AND ARRANGEMENT OF THE PLATES

for holding down the pattern when drawing the cheek and the manner of applying the crane hooks to the pattern, is illustrated in Fig. 10. Bars, *A*, are inserted between the lugs of the arbor column and the inner wall of the pattern and prevent it from moving upwardly when the cheek is being stripped from the stool, drag and pattern.

The Tennessee Coal, Iron & Railroad Co. uses unusually large ingots in its blooming mill. These are 24 x 24 inches and weigh approximately 10,500 to 11,000 pounds. The entire flask equipment, core arbor, etc., necessarily must be very heavy and when ready to pour, the mold for the ingot mold weighs 21,200 pounds. The flasks are cast steel and are made in this foundry. The coring of vent openings in the flasks has been eliminated by the arc-welder, which burns these holes in the flasks much more speedily than the cores can be set in the mold. The ingot mold core is thoroughly vented through the plates, the gases being carried off at the top. Green sand, tempered with water only, is used for both mold and core. Twelve molds are made daily by a gang of 10 men consisting of the following: Six laborers, one rammer, two finishers and one man who closes the molds and pours the castings.

One of the great difficulties that had to be overcome in successfully adopting the jar-ramming operation to the production of these large molds, was the prevention of the movement of the flask on the table of the machine. After careful investigation it was ascertained that this was caused by the leakage of air between the piston and the anvil of the machine which imparted a slight tilting motion to the table. A male and female joint were machined on the two surfaces which are thoroughly packed, thereby preventing the leakage of air and all creepage of the flasks has thereby been eliminated.

The Ingot Mold Mixture

The metal made by the Tennessee company's blast furnaces is not adapted for use in ingot molds, and, therefore, the direct process is superseded by the cupola method. The mixtures are made in a 54-inch furnace which is driven continuously from about 8 a. m. until 4 p. m. The heats vary from 75 to 80 tons, and considering the diameter of the lining the practice is unusual. However, the method of charging is so controlled and fluxes are used so judiciously, that a hang practically never occurs. The metal used for ingot molds has the following analysis: Silicon 1.5 per cent; sulphur, 0.06 per cent; phosphorus, 0.2 to 0.3 per cent, and manganese, 0.60 to 0.65 per cent. The life of these molds varies from 75 to 90 heats.

Preparedness Census of Technical Men

At the request of the council of national defense, the United States bureau of mines has undertaken a census of mining engineers, metallurgists and chemists, with the view of ascertaining the qualifications of each and the line of work in which each could be of most service to the country in time of emergency. This work is being conducted in co-operation with the American Institute of Mining Engineers, and the American Chemical Society. Circular letters are being sent to about 10,000 chemists who are members of the American Chemical Society and 5,000 mining engineers and metallurgists who are members of the American Institute of Mining Engineers.

While there are a large number of mining engineers and chemists who are not members of either of these societies, an effort will be made to obtain as complete a list of these as possible. This will be done by circularizing 4,500 metal-mine operators and 4,000 coal mine operators, asking that they furnish the names of mining engineers, chemists and metallurgists in their employ. These names will be checked against the list of the two societies named and those whose names do not appear as members of the societies will be sent a special letter asking that they furnish the bureau with a record of their experience.

The results to be obtained by this census may be briefly stated as follows: It will make available for use a classified list of chemists, mining engineers and metallurgists. The classification will embrace 27 specific groups of industrial chemists, as explosives, sanitation, foods, dye-stuffs, coal, petroleum, fats and soap, sugar, etc. The mining engineers will be divided into 16 groups of engineering work, as for example, engineers familiar with machinery construction, building construction, dredging, drainage and pumping, underground mining, shaft sinking under compressed air, etc. The classification of metallurgists will embrace 15 groups, as for example, alloys, chromium and manganese, copper, lead, iron and steel, zinc, etc.

By such a minute classification, the bureau will be in a position to furnish on a short notice the names of specialists, as for example, alloy metallurgists, food chemists, coal or iron mining engineers, or specialists in any branch of the mineral industry, so that in case of necessity these technical men could be placed in industrial plants where they would be of most assistance to the country. Experience in foreign countries has shown that the technical men were able to render vastly greater assistance by being placed in the factories than in the regular army. In addition to the technical classification, there will also be a classification of engineers, metallurgists and chemists according to their experience in foreign countries and languages with which they are familiar.

It is hoped that each engineer, metallurgist and chemist receiving these cards will furnish the information promptly in order that the bureau may complete its work with the least possible delay. Complying with these requests in no way obligates the person who signs it, but has the advantage that in case of need he can be placed where his efforts will yield the best results. Chemists, engineers and metallurgists are indispensable in any present day warfare, and their services must be conserved to the best interests of the nation.

Cards calling for specific qualifications of technical men are being mailed to all whose names are available to the bureau. Cards may be obtained by addressing a letter to the director of the bureau of mines.

Removing Zinc and Tin From Cans

Prior to the war steel scrap in the form of cans, etc., was shipped from England to Germany for removing the tin, solder and zinc. The following apparatus has been recently patented in England for work at home.

The apparatus essentially consists of a slowly rotating inclined cylinder and a stationary hopper with a sleeve encircling the rotating cylinder. The latter has a feed aperture which once in every revolution registers with the aperture on the hopper and allows the cans to be fed into the internal heating chamber. To reduce the friction the latter is mounted upon roller bearings. The heating is effected by gas or oil burners.

The heating chamber is surrounded by a firebrick-lined cylinder with outlets for the products of combustion through the short flues at the top. Cans feed into the heating chamber, gravitate slowly through as the chamber rotates and eventually find their way to the outlet where they pass down the chute. The temperature is gradually raised along the length of the chamber and is the highest at the outlet end. In the interior of the heated chamber channels are formed for collecting the molten tin and solder.

Charpy Impact Tests on Steels

The Charpy Impact Test Appears to Differentiate Between Steels of Various Degrees of Brittleness Where the Ordinary Tension Test Does Not—Description of the Machine is Given

BY J. J. THOMAS

A LARGE variety of ordnance steels has been subjected to the Charpy impact test at the Watertown arsenal, and some important improvements have been made as a result of the data obtained. Certain experiments were made not long ago for the purpose of determining how the shock-resisting qualities of various steels are affected by heat treatment.

Figs. 1 and 2 illustrate the type of machine used. The mounted pendulum *A* swings about the point *O*, and is capable of delivering a blow having a total energy of 216.99 foot pounds. *B* is a hardened steel knife edge rounded to a radius of 2 millimeters. The machine is operated by raising the pendulum to an angle of 155 degrees from its lower vertical position, by means of the handle *H* and connecting worm and wheel. The pointer at *X* is then set to read zero on the graduated scale *S*. The test specimen, a small bar 10 x 10 x 60 millimeters, notched to a depth of 5 millimeters at the center, the bottom of notch having a radius of 0.667 millimeter, is then placed across the knife edges at *E*, Figs. 2 and 3, and the pendulum released by the trigger *R*. The test specimen is literally chopped in two, after which the pendulum ascends to an angle depending on the energy remaining after impact. This angle is registered by the needle on the scale *S*.

Knowing the weight of the pendulum and the height of its center of gravity before impact, the energy of the blow can be determined. The height of the center of gravity, for the angle of ascension after impact, is registered on the scale *S*, and thus the energy remaining after impact can be determined. The difference is, of course, the energy absorbed by the test specimen. The lever *D* operates a brake *K*, which brings the pendulum to rest after the test. Fig. 2 illustrates how the test specimen is placed in the machine, the slot always being on the side opposite the point of impact.

A fragment of a broken gun jacket was secured, and the metal tested in the original condition, that is, after it had been heat treated as a large gun forging. Other pieces were tested after reheating to 500, 600, 700 and 750 degrees Cent., respectively, for half an hour, and cooling in the furnace. Tension, Charpy impact and hardness tests were made. From the results of the Charpy tests, it was noted that there was considerable variation between the strengths of individual pieces. For this reason, the average of four or more tests should always be taken before reliable comparisons can be made.

It is interesting to note that for the specimens heated to 600 and 500 degrees Cent., the elastic limit, tensile strength, elongation, and Brinell hardness were the same as the original steel, yet the resistance to shock increased threefold. The reduction of area had increased, and this was the only value which indicated the changed condition of the metal.

For experiments on alloy steels an ingot of nickel-vanadium steel was obtained. Its composition was as follows: Carbon, 0.455 per cent; manganese, 0.50 per cent; silicon, 0.23 per cent; sulphur, 0.049 per cent; phosphorus, 0.033 per cent; nickel, 3.45 per cent; and vanadium, 0.27 per cent. Specimens of both forged and cast steels were tested in the original condition, after which the remaining pieces were given various heat treatments. Both forged and cast steels were given exactly the same heat treatments for the same length of time, in order that a direct comparison could be made.

With the exception of two lower drawing temperatures, 350 and 450 degrees Cent., the same heat treatment produced practically the same elastic limit and tensile strength, but the resistance to shock and the ductility were greatly increased by forging. The maximum increase in impact strength appeared to be reached in both cases at a drawing temperature of 650 degrees Cent. Higher drawing temperatures produced no material increase in shock strength, probably due to the fact that

An abstract of a paper presented at the eighteenth annual meeting of the American Society for Testing Materials.

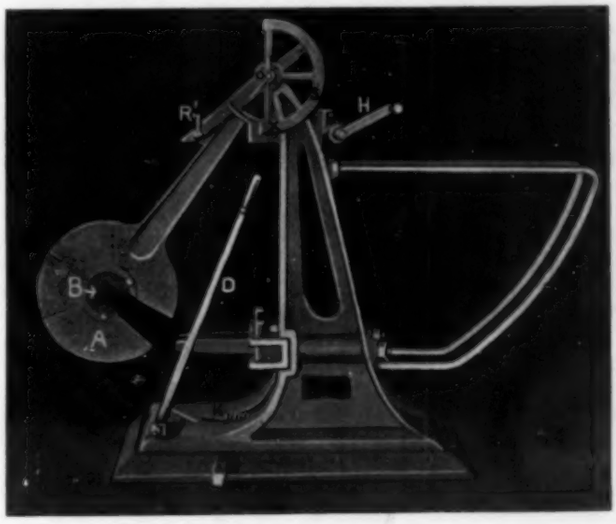


FIG. 1—CHARPY IMPACT MACHINE

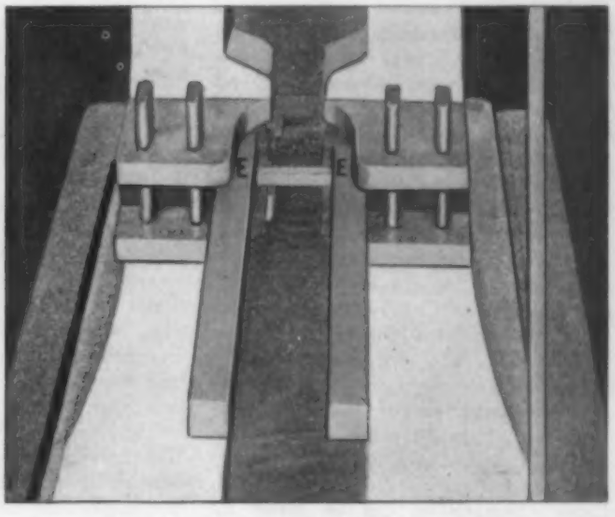


FIG. 2—TEST SPECIMEN IN MACHINE

the steel is entering the critical range and a transformation or recrystallization, occurs.

With a view to determining the effect of the shape of the notch on the results of Charpy impact tests, the following experiment was carried out: The Charpy impact machine used is one of 216.93 foot-pound capacity. The standard transverse specimen for this machine is 10 x 10 x 60 millimeters with a notch 1.3 millimeters wide by 5 millimeters deep, midway along one side. This is a difficult piece to machine from hard steels on account of the narrowness of the notch. If a suitably shaped test specimen could be found, which would give comparative results with the standard and would be at the same time easier to machine, it would perhaps be advantageous to adopt it.

A piece of hot-rolled machinery steel ½ x 3 x 28 inches was selected from stock and cut into lengths of 3 inches. The analysis of this material was as follows: Carbon, 0.134 per cent; manganese, 0.39 per cent; silicon, 0.015 per cent; sulphur, 0.021 per cent; phosphorus, 0.017 per cent. The pieces when cut to length were annealed by heating slowly to 875 degrees Cent. They were held at this temperature 10 minutes and allowed to cool slowly in the furnace over a period of five or six hours, to room temperature. From each of the annealed pieces six transverse Charpy test specimens were machined as indicated in Fig. 3. The specimens were all taken out along the original direction of rolling of the bar. These specimens were tested in the Charpy machine in the usual manner. The figures for resistance to shock of the 15-degree specimens are somewhat higher than those for either the regular or the 30-degree specimens. This difference, however, is hardly greater than may be accounted for by experimental error. From plotted curves it may be stated that resistance to shock and angle of bend are not affected in Charpy impact tests by cutting away the side of the notch up to as much as 30 degrees. By increasing the slope of the side of the notch from 30 to nearly 90 degrees, or at least to 75 degrees, the resistance to shock and the angle of bend are rapidly increased.

Although the Charpy impact test is little used in this country it is believed that the foregoing experiments indicate its value in determining the toughness or shock-resisting qualities of heat-treated steel. The results obtained with tests of alloy steels prove conclusively that no reliable comparisons can be made by breaking single test specimens. From four to six similar specimens should be broken and the average value obtained before comparisons are made. In all the experiments a standard test specimen 10 x 10 x 60 millimeters was used, the span being 40 millimeters. Although the notch is usually made 1.3 millimeters wide by 5 millimeters deep, the results of tests of the effect of shape of notch indicate that the sides may be flared to an angle of 30 degrees without introducing an appreciable error.

The maximum resistance to shock appears to be reached in quenched steels by drawing or tempering at 650 degrees Cent. or just under the Ac1 point. Water quenching after drawing appears to reduce the shock strength of heat-treated steels, the cause of which is unknown but appears to be due to internal stresses

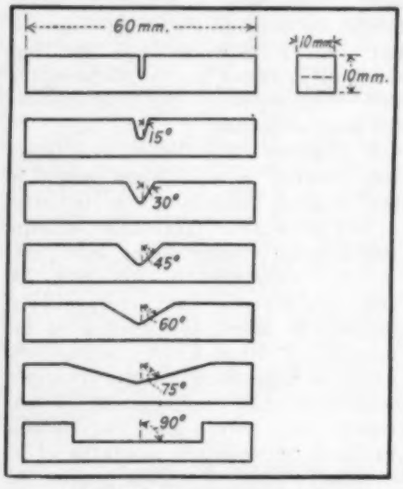


FIG. 3—CHARPY TEST SPECIMENS

set up by unequal cooling. The forging of steel appears to give it a toughness which cannot be obtained by heat treatment alone.

Cast Iron for Engine Cylinders

In a paper read before the Manchester Association of Engineers, Dec. 9, 1916, J. Edgar Hurst discussed the subject of cast iron for engine cylinders. Mr. Hurst stated that under a given load and speed it appears that wear in engine cylinders is proportional to the tensile strength of the iron. Cast iron of the highest tensile strength at normal temperatures is that having the closest-grained structure and the free-carbon constituent existing in a very finely divided or, alternatively, in a rosette form. Regarding pure surface disintegration, the identity of the micro-constituents of cast iron is of little moment, but it becomes of importance in view of the effect of the action of alternating stresses on the character of the surface grains and the effect of the differential polishing of these grains.

With regard to hardness tests, the method of applying Brinell hardness numbers to cast iron in the case of engine cylinders is far from satisfactory. Cast irons giving the same hardness numerically often wear at widely different rates, and, furthermore, the influence of the presence of such elements as manganese and chromium, which in normal percentages were not detected by the hardness numeral, is most important. There is a great amount of uncertainty in the definition of hardness and it is very doubtful whether the methods of determining hardness actually do determine this property in its entirety. The author states that in his opinion in a homogeneous material a true hardness property is its resistance to wear. From this, therefore, the resistance to wear becomes a function of the cohesion of the particles, or, rather, becomes the resistance to deformation, and therefore he suggests tentatively that the yield point is a more correct indication of the true hardness.

Relative to cast iron, the author said it is extremely probable that wear due to surface disintegration is really a function of the brittleness of cast iron. The abrasion or relief polishing is the true wear, in that it depends upon the resistance to deformation of the individual component grains. The temperature at which growth appears to commence is about 650 degrees Cent. and it reaches a maximum at about 750 degrees Cent. After prolonged heating, in addition to a gradual increase in volume a gradual increase in weight is also noted. These facts are established: that alloys not containing graphite do not grow, and alloys containing graphite are, under suitable conditions capable of growing.

In this connection the author discussed piston troubles with diesel engines. He believes that the ultimate cracking of diesel engine piston tops can as a general rule be traced to the phosphorus content of the cast iron, and the cracking is practically eliminated when this is kept sufficiently low. Specimens taken from the center of a star crack in a piston showed liquation of the phosphide eutectic. This would undoubtedly increase the magnitude of the internal strains and, in addition, at points in the region of the center this same eutectic would at these temperatures be dangerously near its liquation point.

American Iron Offered in England

Quotations Too High to Encourage Business—British Government Continues to Buy War Steel on Increasing Scale and Mill Congestion is Augmented —Scarcity of Raw Steel Causes Shut Downs

Bureau of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, England, April 6, 1917.

NUMEROUS offers of American pig iron have been received lately, which is unusual. In the past the exported material has been either finished or half-finished metal so that the offer of American pig iron is substantially a new departure. So far as has been ascertained no actual business has resulted. The offers are around £7 15s ($37.20), f. o. b. United States, and as the cablegram received from *The Iron Trade Review* mentioned $40 iron as being done, there is substantially no difference between prices to British and American buyers. Such prices cannot be commercially attractive, in view of the enormous freights, railway rates, insurance costs, etc., before delivery to the consumer here. Business, in fact, is not possible on this basis. The iron at the quoted price would cost as much as British puddled bars which are about £12 10s ($60). It is clear therefore that if American pig comes here it can only be to meet urgent needs, which practically leave prices out of consideration.

The relation between consumption and production of pig iron is in a better balance. In the Cleveland district many consumers have satisfied their present needs, and while they are open to buy forward to some extent, they are under no obligation. Makers similarly are rather cautious as to future business. In the Cleveland district, the local committee continues to make allocations of material quite satisfactory to the trade. It is possible in that district to carry on a fair weight of business with the allies, although neutrals have to make out a very good case to get supplies, and a tight hand is kept upon export licenses. The shipments for the month, reported March 21, were 28,384 tons.

In the Midland district there is a fair amount of buying, with prices firm in all departments except Northampton where slight concessions are obtainable. A feature of Midland pig iron production is that numerous furnaces are now going over to the production of basic in compliance with the government requirement. To some degree this is dependent upon ship arrivals, and success of the submarines would cause some inconvenience; up to the present the situation seems to be well in hand and outputs are increasing. The chief difficulty in the way of production is scarcity of fuel largely due to shortage of wagons and general railway congestion. The scarcity is to some extent due to slackness on the part of the colliers, due to bad weather. The same cause has increased the competition of householders for fuel, household stocks having been exhausted largely by the long and severe winter. All this helps to cut down the supply of fuel to forges, mills and factories. There is no special change in prices.

Mr. Kellaway, a government official, has written a member of parliament that the need for a large increase in the output of iron ore will necessitate a considerable addition to the number of men working in the ironstone mines in the Cleveland and other districts. The question of releasing from the colors miners not fit for general service is under discussion at the war office. This answer signifies the authorities still are taking steps to largely increase the output of war iron and steel.

Finished Iron Scarce

There is an extraordinary lack of finished iron. For many years the village and town iron warehouses so largely used to meet the requirements of the farmer or of the village blacksmith have been among the best customers of South Staffordshire iron works and Birmingham wholesale merchants. Many of these warehouses as well as blacksmith shops have been forced to close, while many more are entirely depleted of desired sizes of iron. In the discrimination between war and non-war business the village iron warehouseman has fared badly. The absurdity of this gradually is being recognized as the country realizes the enormously important part which agriculture must play in successful warfare.

The Midland ironworks are swamped with orders, and much war business is being refused. Ordinary buyers are being pushed further back and some shipping orders arranged a year ago still are unexecuted; the customers have in fact been invited to cancel them voluntarily or have them struck off the order books. It is remarkable that the government is ordering as plentifully as ever; indeed the weight of the business increases. This appears to be due to the constantly growing size of the army; but a very important tonnage of business in the way of wire, trenching tools, and digging implements generally, has been placed.

The difficulty in getting raw steel is greater than ever. Many sheet and tin plate mills are being thrown into idleness for days at a time through the non-arrival of half-finished steel. The trade is much impressed with the success of the government in controlling the use of material. The classifications system has been brought to such perfection that the destination of every ton of material is fully known; the precise use to which machinery is being put, likewise is known to representatives of the government as to mill owners. The business in galvanized sheets continues to be on the basis of £28 10s ($136.80) with black sheets at £19 10s ($93.60). Production is quite small, in remarkable contrast to the activity reported in America. The great activity in ship building makes enormous demands upon Barrow-in-Furness and all the west of Scotland steel works which are showing record productions of ship building material.

The retreat of the Germans on the western front has been received with remarkable coolness by the British people generally. We are naturally pleased to see the American developments and the skillful and elaborate arrangements to co-operate effectively with the allies when America really enters the war. Food continues fairly plentiful, though the price is rather high. There is no slackening in the rate of enlistment. The authorities are a little more successful in their efforts to feed the army without weakening essential civil industries.

Builds Indian Furnace

The Mysore state government of India has awarded a contract to the William B. Pollock Co., Youngstown, O., for the building of a 50-ton charcoal blast furnace to be finished in one year. The same company is also building two 500-ton stacks for the Tata Iron & Steel Co., of Sakchi. Charles P. Perin, New York, is engineer for both projects.

Pick Site But Armor Plant Waits

Selection of Charleston, W. Va. For Government Works Due to Accessibility to Raw Material Says Secretary Daniels—Five Open Hearths Are Planned—Gage Manufacturers Mobilized to Aid Production of Small Arms and Ammunition

Bureau of *The Iron Trade Review*,
708 Metropolitan Bank Bldg.,

WASHINGTON, April 17.—Definite plans have been laid out for the proposed government armor plate plant, which will be located at Charleston, W. Va., if it ever becomes a reality. The steel works planned will consist of five open-hearth furnaces to be fired from ten gas producers and to be served by two electric charging machines. A large crane will command the steel works for the handling of ingots and ladles. The forging and bending shop is to be fitted out with three 14,000-ton capacity presses, probably steam intensifiers, ingot heating and car bottom plate heating furnaces and other equipment suitable to the heavy duty required. Other departments are to include a machine shop, cementing and tempering shop with a large number of car bottom plate heating furnaces and water hardening sprays, electric power plant, boiler plant, physical and chemical laboratory, carpenter shop, blacksmith shop, coal storage and crushing plant, locomotive tool house, store house and office building, reservoir and various miscellaneous buildings.

In announcing that the 20,000-ton government armor plate plant will be erected at Charleston, Secretary of the Navy Josephus Daniels stated, "Work will be commenced at once and driven to quick completion". The secretary of the navy apparently allowed himself to become over-enthusiastic. The obstacles in the way of immediate erection by the government of the plant have been pointed out frequently. Mr. Daniels himself said recently that not only was the $11,000,000 appropriated for the plant an insufficient sum, but that also the "labor and material market" today is such that building of the plant "might well be deferred for the present".

The conviction, therefore, is entertained that actual work of building the plant will not be started either in the immediate or in the near future. The lack of money and of skilled labor, the inability of the government to procure the required equipment, such as the tremendous forging press, etc., all have been elements which have created this conviction. There are many who do not think the plant ever will be built. To this claim, Secretary Daniels replies that it will be built "as certainly as the sun rises".

The projectile plant, however, may be built at once, according to all indications. It is to be located on the same site as that selected for the armor plant. Machinery for the projectile plant, Mr. Daniels said, has been purchased, and he has said he expects to have it in operation some time during the coming summer. In addition to manufacturing projectiles, it is the intention of the secretary to have the plant produce gun forgings also.

The selection of Charleston as the site for the armor and projectile plants was based upon the recommendation of the naval board which has been investigating the matter during the past four months. This board consists of Admiral Frank F. Fletcher, Captain Frank H. Clark and Civil Engineer R. E. Bakenhus.

Why Charleston Won Choice

"The selection of Charleston," said Secretary Daniels in referring to and summarizing the board's recommendation, "keeps faith with the people by meeting every need. Economy and efficiency are guaranteed by the accessibility of raw materials. Charleston is the center of coal fields having an annual output of 30,000,000 tons, and at hand are extensive natural gas fields and crude petroleum areas. Basic pig iron is only 172 miles away and bessemer about 60. Limestone and dolomites are available locally and the freight cost is low on ferro-chrome, ferro-manganese and nickel. The great Kanawha river offers ample water, and it is also possible for the government to develop its own water power. Two trunk lines to the west and three trunk lines to the east furnish quick movement of raw materials and finished product, and water transportation to the gulf is also possible, all at lower rates than those for competing cities.

"Charleston offers to the government, without cost, the choice of various eligible sites, and in addition to this plant location, extends the pick of several protected gorges admirably adapted for use as proving grounds. As it is now, all armor plate, when finished, must be shipped for testing to Indian Head, near Washington, a slow process and expensive. This combination of plant and proving grounds is not by any means the least of Charleston's peculiar and superior advantages.

"Work will be commenced at once and driven to quick completion. Competition with private manufacturers is not the controlling idea. It is always well, as a matter of course, for the government to make this first hand proof of producing cost, but it is even more imperative that the navy shall have its practical laboratory in which

LOCATION OF ARMOR PLANT SITE IN "PITTSBURGH DISTRICT"

the invention of its own experts may be tested and developed."

Three principal elements enter into the location of the plant, the board points out in its report, only a part of which was made public. The operating force is considered the most important and includes, not only common labor and mechanics, but also the necessary foremen, supervisory force, technical assistants and administrative heads. The raw materials of suitable quality must be available, the board said, at the lowest combined original cost and freight rate and, finally, the cost of delivery of the finished product. In addition to these matters, the board considered possible changes in the process of manufacture, embracing a change to oil or powdered coal as fuel or the adoption of the electric furnace, the proximity of low cost power, an ample water supply, a satisfactory local site and suitable climatic conditions.

Treating the subject from all its phases the board concluded and recommended that the "Pittsburgh district" was the proper place for locating the plant. It is interesting to know that Charleston was regarded as a part of the Pittsburgh district, though it is 272 miles distant. The site is considered by practical men of the trade to have a number of real advantages.

Lack of Gages to Cause Rifle Shortage

WASHINGTON, April 17.—Plans for the production of rifles, small arms and ammunition were considered at a recent meeting of the general munitions board of the council of national defense. Various manufacturers of gages and Representative John Q. Tilson, Connecticut, a member of the committee on military affairs and about a dozen manufacturers attended. It was the purpose of the meeting to develop what had been done by makers in the way of preparing these highly essential gages, so that rifles, small arms and ammunition could be supplied in mass production. Each manufacturer was called upon to state how many draftsmen and tool makers he could place at the disposal of the government to produce gages without interrupting important work now being done for the entente powers.

It was developed that it will require at least 18 more months before the government can procure enough gages in accordance with United States specifications to meet requirements for the proposed army of 1,200,000 men the first year and of 2,000,000 men the second year. Because of this deplorable condition the government will be compelled temporarily to abandon plans for the production of its regular Springfield rifle and to substitute the much less powerful English Enfield rifle. Gages for the production of the latter exist in ample number to take care of the needs of this government, it is stated, or can be produced in sufficient number quickly, without disturbing work being done for the allies. It is understood to be the plan of the general munitions board to modify the specifications of the Enfield rifle by rechambering it so that it can take reguar Springfield ammunition. The Springfield rifle, which, military authorities of this country insist, is the best weapon of the kind in the world, has a range of 2,800 yards as against only 1,600 yards for the Enfield gun. The latter has a longer barrel than the United States standard rifle, and there are some authorities who think the Enfield after being rechambered to fire Springfield ammunition, will have a more powerful velocity than the Springfield rifle. This opinion, however, is not shared generally by experts.

The plan of the general munitions board will probably call for manufacturers getting to work at once upon the production of gages for artillery and small arms ammunition. Gages for this purpose, it was pointed out, can be changed over without a great deal of difficulty or loss of time, and are not so numerous as those required for rifle manufacture. The United States government will need 1,000,000 rifles at once in addition to the 750,000 Springfield rifles now on hand. The latter will be used by the regular army and the national guard, in all probability. The present total capacity for the manufacture of Springfield rifles, produced only at government arsenals, is only 213,000 annually. This capacity would not even take care of the wastage, never less than 40 per cent, and sometimes as high as 150 per cent, for the regular army and national guard, which, mustered to full strength, totals about 750,000 men. When it is taken into consideration that even plants which are today producing rifles for foreign countries would require 18 months to equip themselves with the proper gages, inspection devices, etc., for the production of Springfield rifles, the unpreparedness of other plants in this direction is emphasized. The Springfield rifle has more than 100 parts and it requires more than 1,400 distinct plant operations to produce the finished piece. This number of operations means that 1,400 gages are required in order that the accuracy of each part shall be determined. These devices are of themselves difficult of manufacture and require a long time to produce. Drawings and specifications for them are almost completed, it is understood, but this is only a small portion of the work involved. It was due to the foresight of Representative Tilson that congress made appropriations for these tools last year and brought about what little progress that has been made.

The meeting with the gage makers was presided over by Francis C. Pratt, of the General Electric Co., who has been named as chairman of the board on gages of the general munitions body. Among other manufacturers present were Frank O. Wells, president of the Greenfield Tap & Die Corporation, Greenfield, Mass.; B. W. Hanson, Pratt-Whitney Co., Hartford, Conn.; Mr. Blackall and R. W. Reid, Taft & Pierce; Vice President Henry Brewer and Mr. McIntosh, Winchester Repeating Arms Co.; commandants of the government arsenals and navy yards; Col. J. E. Hoffer, bureau of ordnance, war department; Major P. E. Pierce, army war college.

Make Sure What the Country Needs of You

"How can I be of most use to my country now that war has been declared?" is the big question that is agitating many minds in the iron and steel and other industries.

A sensible reply to this question is embodied in the advice which a navy officer a few days ago gave to a leading steel company official.

"Sit tight," said the naval officer, "and do not make England's mistake of the first year of the war, when a large proportion of the thinking men of that country rushed to enlist.

"The natural result was that commerce and industry suffered a certain degree of demoralization to be expected on the removal of these men.

"Consider what would happen were every business man in this country to enlist for active service. The most sensible course is to wait and see what the government really needs of you."

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Workman Lauds Steel Corporation's Acts

STOCKHOLDERS gave their full approval to the policies and acts of the management of the United States Steel Corporation at their annual meeting held at Hoboken, N. J., April 16. E. R. Smith, a heater at the Canal Dover plant of the American Sheet & Tin Plate Co., spoke at length at the invitation of Chairman E. H. Gary. Mr. Smith, who has participated in the annual meetings of the two previous years, expressed earnest approval of the Corporation's affairs and policies from the standpoint of one who is both employe and stockholder. He reviewed the sudden change from industrial depression to great prosperity, and indicated that the Corporation strove to protect its workmen during hard times and was not forgetting to share with them the fruits of present good times. Speaking for the employes, Mr. Smith said they are patriotic and loyal to the nation in these critical times and they are equally loyal to the interests of the Steel Corporation.

Judge Gary addressed the stockholders briefly, reviewing the activities of the past year and outlining the Corporation's policies. He laid some little stress on the matter of increased dividends, saying this question had been raised on various occasions. He pointed out that while present cash holdings are large and might be distributed to stockholders, the management was compelled to think of the contingencies of the future when large cash resources might be essential to maintain the Corporation's position both at home and abroad.

As to the advisability of establishing a special fund out of profits in good years from which dividends might be distributed in lean years, Judge Gary said this matter had received serious consideration. "In fact," he said, "we have large reserves and investments which might be termed in the nature of such a fund but the management has not deemed it advisable to lay aside a definite amount to provide for dividends over say four or five years, for the time might come when the funds so reserved might be used to much greater advantage in other ways. Four or five years ago, we had some surplus funds which might have been used but they were invested in other ways by which they have yielded large returns.". Judge Gary estimated the Steel Corporation would pay this year in taxes between $60,000,000 and $65,000,000.

The number of shares represented in person or by proxy was 1,968,648 of preferred and 2,459,084 of common. The following were elected as directors for the three years ending in 1920: Robert Bacon, Samuel Mather, Thomas Morrison, John S. Phipps and Daniel G. Reid. The number of directors remains unchanged at 14.

Lackawanna Report

One year ago the Lackawanna Steel Co. issued its regular quarterly report for the first three months of 1916, in which it set forth earnings far surpassing any previously shown in the history of the company. This was the first of a series of brilliant exhibits made by the various leading steel producers resulting from operations during the present abnormal economic conditions in the steel industry.

Now, 12 months later, Lackawanna Steel again issues a financial statement, this time for the first quarter of 1917. This showing exceeds that of a year ago by as remarkable a margin as that of 1916 surpassed previous showings. Total net earnings for the period were $6,203,232, as compared with $3,247,593 a year ago. The balance available for dividends after depreciation, interest and other charges was $5,290,584, equivalent to an annual rate of $60.28 a share on the outstanding stock compared with $2,251,068, equal to a rate of $25.90 a year ago. Earnings for all of 1915 were equal to $6.93 a share. Following is a comparison of income accounts for the first quarters of 1917 and 1916:

	1917.	1916.
Total net earn. after ord. repairs and main., but not ren.	$6,203,232.93	$3,247,593.30
Int. on bonds, etc.	311,293.74	402,500.00
Subsid. cos.	54,083.33	76,662.50
Rentals & royalties	8,542.72	25,459.00
	$ 373,919.79	$ 504,621.50
Balance	5,829,313.14	2,742,971.80
Extinguish. of mines and min'g invest.	101,685.67	71,792.32
Deprec. and renew.	437,042.96	420,111.05
	$ 538,728.63	$ 491,903.37
Profit	$5,290,584.51	$2,251,068.43

The following table shows Lackawanna's surplus after all charges, for the first quarter of each of the past four years:

1917.	$5,290.584
1916.	2,251,068
1915.	*565,759
1914.	445,206

*Deficit.

Like the United States Steel Corporation, Lackawanna Steel's unfinished business had climbed to unprecedented totals on March 31 of this year, amounting to 992,096 tons, an increase of 120,220 tons over the same quarter of last year. Following is a table showing the unfilled tonnage of Lackawanna Steel at the close of each of the last five quarters:

March 31, 1917.	992,096
Dec. 31, 1916.	811,126
Sept. 30, 1916.	745,694
June 30, 1916.	932,857
Mar. 31, 1916.	871,876

Canadian Plants Merge

Toronto, April 13.—A merger has been arranged between the Dominion Steel Foundry Co., Ltd., and the Hamilton Steel Wheel Co., Ltd., a subsidiary, by an exchange of shares of the two companies for shares of a new corporation to be organized under the style of Dominion Foundries & Steel, Ltd., with head office at Hamilton. The board of directors will consist of the present boards of the two companies, with C. W. Sherman as president and the following directors: W. J. Verity, Robert Hobson, J. J. Harty, Paul J. Myler, W. E. Phin, S. A Crone, Frank A. Sherman and A. G. Wright. The exchange of shares will be on the following basis. Two and one-half common

shares of the new company for each common share of Dominion Steel Foundry; one 8 per cent cumulative preferred share of the new company for each 7 per cent preference share of Dominion Steel Foundry; and one common share of new company (par value $100) for each 4 shares (par value $25) of Hamilton Steel Wheel Co.

Stock Report

Following is a table showing closeing quotations April 14 of a number of leading steel and industrial stocks on the New York stock exchange, and net changes for the preceding week:

	Close Apr. 14.	Net chg.
American Can	46¼	+ ⅛
American Can, prfd.	106	— ¼
American Car & Fdy.	67½	+1½
American Car & Fdy., prfd.	116⅛	+ ⅛
American Locomotive	69	+2
American Steel Foundries	59	+1
Baldwin Locomotive	55¼	—2¼
Baldwin Locomotive, prfd.	100⅛	— ⅞
Bethlehem Steel	135	.....
Colorado Fuel & Iron	48	— ⅜
Continental Can	92⅛	+1⅛
Crucible Steel	63⅞	— ⅛
Crucible Steel, prfd.	109½	—1
General Electric	166⅝	+3⅜
Gulf States Steel	128	+9⅞
Gulf States Steel, 1st prfd.	107	+ ¼
Internat'l Harv. of N. J.	117¼	+1¼
Int. Harv. of N. J., prfd.	115⅜	—2⅛
Internat'l Harv. Corp.	80	+1⅞
Int. Harv. Corp., prfd.	111	.....
Lackawanna Steel	85	+2½
Nat'l En. & Stamp. Co.	34½	+1⅜
Pressed Steel Car	75½	+ ½
Pressed Steel Car, prfd.	102	.....
Pullman Palace Car	158½	—1½
Republic Iron & Steel	80½	+2
Republic Iron & Steel, prf.	102½	+ ⅜
U. S. C. I. P. & Fdy. Co.	19⅛	— ⅛
United States Steel	113¼	+2⅜
United States Steel, prfd.	118	+ ½
Westinghouse Mfg.	49⅞	+ ¾

The following table shows maximum quotations of a number of steel and allied stocks not listed on the New York stock exchange, compared as of April 13 and April 5:

	Apr. 13.	Apr. 5.
American Radiator	290	296
American Ship Building	75	77
Cambria Steel	45⅛	.....
Chicago Pneumatic Tool	70	69¼
LaBelle Iron Works	84	85¼
Lake Superior Corp'n	20¼	21⅞
Stewart-Warner Speed. Co.	77¼	83
Westinghouse Air Brake	127	128½
Westingh'se Elec. & Mfg. Co.	50¼	53

Firm Obtains License

Philip C. Berg, Ohio banking superintendent, has announced that the Geiger-Jones Co., Canton, O., will be licensed under the Ohio securities sales law on May 1. Three conditions are imposed: That no unearned dividends be paid, that surplus accounts shall not be increased to pay dividends and that advertising be done in exact accord with financial conditions. The license ends the controversy between Geiger-Jones and the state growing out of the enactment of the law regulating the sale of securities in the state.

Financial Crop Ends

The International Steel & Iron Co., Evansville, Ind., recently issued $150,000 preferred stock.

* * *

The Advance Machinery Co., Toledo, has increased its capital stock from $100,000 to $200,000.

* * *

The Tessmer Machine & Tool Co., Detroit, has increased its capitalization from $20,000 to $50,000.

* * *

The International Machine Tool Co., Cleveland, has increased its capital stock from $15,000 to $100,000.

* * *

The Chaney Mfg. Co., Springfield, O., has increased its capital stock from $20,000 to $30,000.

* * *

Employes of the Enamel Pipe & Engineering Co., Elyria, O., have been granted a 10 per cent wage increase, effective Monday, April 16.

* * *

The directors of the Draper Corporation, Hopedale, Mass., have voted to subscribe for $1,000,000 of government war bonds.

* * *

United Alloy Steel Co., Canton, O., declared regular quarterly dividend of $1, payable April 21, to stock of record April 10.

* * *

Chicago Pneumatic Tool Co., Chicago, has declared the regular quarterly dividend of 1 per cent, payable April 25 to stock of record April 14.

* * *

Directors of the Gulf States Steel Co., Birmingham, Ala., were re-elected at the annual meeting held at Wilmington, Del.

* * *

The capital stock of the Des Moines Steel Co., Des Moines, Ia., has been increased from $10,000 to $100,000. It is understood that the capacity of the plant is to be greatly increased.

* * *

The great total of $382,178,696 represents the exports of brass and copper in the seven months ended January, 1917. This compares with $126,291,152 in 1916 and $55,038,632 in 1915.

* * *

It has been announced by Capt. O. D. Trieber, vice president and general manager of the National Ship Building Co., Seattle, that the company has been reorganized with a capital stock of $2,000,000.

* * *

The increase in capitalization of the Standard Nut & Bolt Co., Valley Falls, R. I., from $100,000 to $200,000 is to take care of expanding business, according to W. E. Blount, secretary and general manager.

* * *

Babcock & Wilcox Co.'s surplus at the end of 1916 was $4,689,418, compared with $3,476,677 at the close of 1916. Unfinished business on the company's books at the close of 1916 was $12,761,864, compared with $4,655,388 at the close of the previous year.

* * *

New Inland Steel Co. stock is being quoted in Chicago at 188. The old stock, which was exchanged for new at the rate of two and one-half shares for one, was quoted about 460 to 480. It has been stated that 60 per cent of the original stock never has been transferred on the books.

* * *

The Graton & Knight Mfg. Co., Worcester, Mass., which recently increased its capital from $2,000,000 to $2,500,000, has declared a stock dividend of 33-1/3 per cent, payable to common stockholders of record on April 3. The company now has outstanding 5,000 shares preferred and 15,000 common stock. Its balance sheet shows property value at $984,350 in excess of all liabilities.

* * *

Joseph Dixon Crucible Co. for year ending Dec. 31, 1916, showed surplus of $4,976,570, indicating net earnings applicable for dividends after all charges of $3,767,404, equal to over $188 per share on the $2,000,000 capital stock outstanding. Approximately $412,000 was paid out of earnings for improvements and the company is erecting a new addition to its plant which will cost approximately $250,000. Annual meeting will be held April 16 to elect seven directors.

* * *

The Marlin Arms Co., New Haven, Conn., has purchased the plant of the Mayo Radiator Co., Hamden, Conn., and in addition to its present operations in turning out machine guns, will manufacture automobile radiators. This makes three industrial plants the Marlin interests have taken over in a short time, the other two being the Rockwell-Drake Co., of Plainville, Conn., and a plant in Philadelphia. Marlin officials said Virginius J. Mayo, president of the Mayo company, would be retained as the manufacturing head. The Mayo concern recently was placed in the hands of a receiver.

* * *

At the annual meeting of the directors of the Colt Patent Fire Arms Mfg. Co., recently, a dividend of $2,500,000 was declared. The present capital stock of the company was increased from $2,500,000 to $5,000,000 and the par value of each share was reduced from $100 to $25. The market price of the new shares will range around $130. The profits for the year were 259 per cent or $6,345,731.39. New buildings cost $530,000 and new equipment $1,750,000. Cash on hand and investments amount to $11,518,402.97. The value of the plant is $2,762,151.94, and of the merchandise on hand, $2,994,448.74. For the munition tax $850,000 has been set aside, and there are $25,000,000 worth of unfinished contracts.

Aluminum Foundry

Of the Latest Design to be Built at Manitowoc

The Aluminum Castings Co., Cleveland, operating seven large foundries, has disposed of its plant in Manitowoc, Wis., to the Aluminum Goods Mfg. Co., Manitowoc, Two Rivers, Wis., and Newark, N. J., and will start work May 1 on the construction on a new site in Manitowoc of one of the largest and most modern aluminum foundries in the country. The company recently completed a new plant costing more than $250,000 at Cleveland. The new Manitowoc foundry will be 200 x 300 feet, of steel, brick and reinforced concrete construction, and will cost about $250,000. The new plant will be electrically operated with power obtained from the High Falls Power Co. Contracts for the erection work will be awarded immediately so that the foundry will be ready for occupancy Oct. 1, when the present plant will be delivered to the Aluminum Goods Mfg. Co.

An interesting sidelight on the sale of the Manitowoc foundry is that the plant now reverts to the original owner. In 1903 Henry Vits sold the foundry to the Werra Aluminum Castings Co., which in 1910 was absorbed by the Aluminum Castings Co. Mr. Vits and brothers then established the Aluminum Goods company and built a plant nearby.

Plans Tin Smelter

The William Harvey Corporation, newly organized, will start work shortly on the erection of a tin smelter on Mill Basin, Jamaica Bay, N. Y. The plant will have an output of more than 20,000 tons of pig tin a year. The Harvey corporation is closely related to William Harvey & Co., Ltd., large tin smelters of Europe. Another important project at Jamaica Bay is that of the National Lead Co., which will start work within two weeks on a plant addition for the manufacture of sheet lead and lead pipe. The proposed addition will require 7,000 tons of pig lead annually.

Produces Much Coke

Chief State Mine Inspector C. H. Nesbitt has announced official figures on coal and coke production for 1916 in Alabama showing 18,234,625 tons of coal against 15,266,831 in 1915, 4,385,493 tons of coke, against 2,958,062 tons in 1915. Jefferson county, of which Birmingham is the county seat, produced 9,973,202 tons of the coal and 3,872,738 tons of the coke. Eleven counties produced coal and three coke. Tuscaloosa county made 389,372 tons of coke and Walker 123,383 tons. Estimates are now being made that the coal production in Alabama this year will be 20,000,000 tons and coke about 6,500,000 tons.

Watch Employes in War Plants

Philadelphia, April 17.—Increased efforts to guard against damage to industrial plants, as well as to public property, by war fanatics, are among the signs of the present tense times in eastern territory. Practically every plant of importance now maintains a strict watch over the movements of all men and any suspicious action which cannot satisfactorily be accounted for is cause for immediate discharge. Visitors to plants, and especially those manufacturing war munitions or material used in waging warfare never are allowed out of sight of a guard. One large eastern manufacturer employing approximately 10,000 men, has worked out a system whereby each man has been investigated as to nationality, sympathies, etc., and the names of the workers accordingly have been grouped under the headings "loyal", "doubtful", and "suspicious". Great precaution is exercised in inspecting all important machinery before it is set in motion. Pieces of brass quite frequently have been found in the bearings of important machines. In one case about a week ago a transformer was found so wired that had the current been turned on the equipment would have been wrecked and the plant crippled indefinitely.

In one case, the men at a plant near here engaged in filling orders for the navy went on a strike. Naval officers were preparing forcibly to put the men to work when the company succeeded in settling the strike.

Advance Coal Rates

Bituminous coal freight rates from mines in Pennsylvania, West Virginia, Kentucky, Ohio and Tennessee to Lake Erie ports for transshipment, sought by eastern railroads in connection with their proposed general advance in freight rates, will be increased 15 cents a ton April 15 by authorization of the interstate commerce commission. The present rate on coal from western Pennsylvania for shipment to lower lake ports is 83 cents, including the handling of fuel on dock. Operators in western Pennsylvania have received no official announcement of the advance in rates.

Extensive Additions

Being Made to Milwaukee Malleable Foundry

Milwaukee, Wis., April 16.—The capacity of the South Side Malleable Castings Co., Fourteenth avenue and the C. & N.-W. tracks, Milwaukee, Wis., will be increased to 12,500 tons per annum when foundry and shop additions now under construction are completed June 1. Kroening & Sausen, general contractors, have taken the contract for new buildings to cost more than $75,000. These additions are as follows: Foundry, 125 x 150 feet; core room, 40 x 75 feet; hard iron room, 75 x 100 feet; shipping room, 100 x 100 feet; pumping mill room, 50 x 100 feet; office building, 50 x 75 feet. New sand and coal bins and sheds of concrete also will be erected. The original foundry is 120 x 250 feet. The new equipment will consist of two new furnaces, three heating ovens, 10 new tumbling mills and new sand blast machinery.

Plant is Purchased

The Aetna Foundry & Machine Co., Warren, O., has been taken over by W. W. Woodruff, of the Jeffrey Mfg. Co., Robert L. McCarroll, of the United Coal Co., and J. McLain, of the McLain Mining Co., all of Pittsburgh. The Warren Co. will continue to manufacture castings and tin plate machinery. It is the intention of the new owners to greatly increase the size of the plant in the near future.

Plan New Ways

Additional land, which will increase its total property to 95 acres, has been acquired in Alameda, Cal., by the Union Works, according to papers recently filed for record. This additional ground is required to enable the company to carry out its plans for the extensive enlargement of its plant, which provide for the construction at one time of four 1,000-foot vessels.

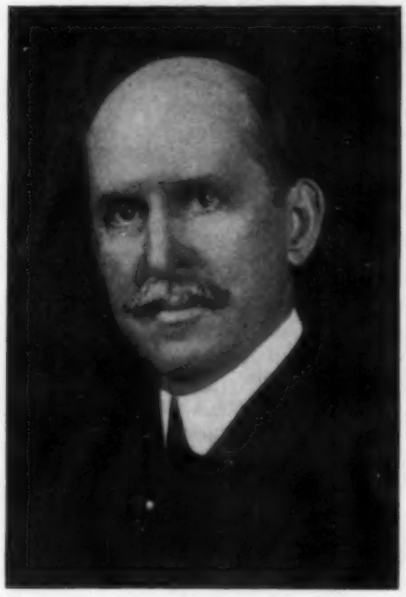
Start Another Furnace

The eleventh open-hearth furnace at the Ivy Rock plant of the Alan Wood Iron & Steel Co., has been lighted. Work is being rushed on the twelfth and last furnace, and it is expected that this will be completed by the end of April. The Ivy Rock plant then will have nine furnaces which have a capacity of 55 tons each, while the three new ones are 75-ton units.

Obituaries

FRANK SPENCER WITHERBEE, a leader in eastern iron ore development, prominent in the first circles of the iron and steel industry and a business man of high standing, died at his home in New York, April 13, after an illness extending over a number of months. His age was within a month of 65 years. His health had not been of the best for several years. The death of his only son at the age of 21, several years ago, was a shock from which he never fully recovered.

Mr. Witherbee came of a family



FRANK SPENCER WITHERBEE

that by its enterprise in the development of these ore deposits, stamped its name historically on the iron ore resources of the Adirondack mountains and made the Port Henry district in New York state one of the most important in the country apart from the Lake Superior region. None did more to commercialize the vast iron ore wealth of upper New York state than Mr. Witherbee, who as a mere youth just out of college assumed unusual responsibilities on the death in 1875 of his father, J. A. Witherbee. The elder Witherbee, in conjunction with S. H. Witherbee, had founded in 1849 the firm of Witherbee, Sherman & Co., of Port Henry, and had inaugurated operations at Mineville. The young Yale graduate, taking up the work of his father, displayed an executive power and progressive business character, which applied over a series of years has brought about much of the present-day exploitation of the Lake Champlain ores. At his death, that district had expanded into a producer of 1,500,000 to 2,000,000 tons annually. The concentration operations employed for the effective separation of these magnetites have become the most advanced and extensive in the country and have been broadening steadily from year to year. The part they have played in the rejuvenated eastern iron and steel industry of recent years has been great. At the close of his life, Mr. Witherbee occupied the presidency of Witherbee, Sherman & Co., Inc., of the Cubitas Iron Ore Co.; and of the Lake Champlain and Mariah Railroad Co.; and was vice president of the Cheever Iron Ore Co., all properties of the Port Henry district.

Though his life largely had been identified with iron ore operations, Mr. Witherbee's connections had embraced various iron and steel manufacturing enterprises. He was president of the Troy Steel Co. when the basic bessemer plant was built on Breaker Island, opposite Troy, in 1896. He was active as vice president of the Tennessee Coal, Iron & Railroad Co. during the administration of Donald Bacon. Though not a technical man, he took a great interest in scientific bodies. He was closely affiliated with the American Institute of Mining Engineers, and more recently with the American Iron and Steel Institute, of which he had served as a director since its formation. He was a director and member of the finance committee of the Equitable Life Insurance Co., a director of various other business corporations outside of iron and steel, and a member or director of numerous social clubs, art and historical societies, etc. He was one of the foremost advocates of improved waterways of New York state, served on a number of canal commissions and was one of a commission of three appointed by Governor Roosevelt to study the canal system of Europe. As a Republican, he was high in the councils of his party. He acted as an elector for Harrison and Taft. In 1912 he received the insignia of the Legion of Honor from the French government in recognition of his services which he gave in connection with the Champlain tercentenary celebration.

Mr. Witherbee was born in Port Henry, N. Y., May 12, 1852. His ancestry was English.

Henry Schoonmaker, secretary of the American Bridge Co., whose death at Brooklyn occurred April 9 recently, was born in Kingston, N. Y., on March 18, 1856. He was educated in the Kingston schools and later attended Rutgers college. He began his business career as clerk in the law office of his father, Augustus Schoonmaker, later accompanying him to Albany, where the latter served as attorney general of New York

HENRY SCHOONMAKER

state. Mr. Schoonmaker served as claim agent at Hornell, N. Y., for the Erie railroad, and in 1889 was transferred to New York as assistant attorney for that company. He resigned from the Erie railroad in 1896 because of ill health. He became secretary of the American Bridge Co., shortly after its organization and continued in that capacity until his death.

John L. Pool, formerly export sales manager of the Hupp Motor Co., Detroit, died recently in Chicago.

Ernest G. Schreiber, president of the American Potato Machinery Co., Hammond, Ind., is dead, aged 50 years.

George Henry Sargent, member of Sargent & Co., New Haven, Conn., hardware manufacturers, died recently at his home in New York, at the age of 87. He was born in Leicester,

Mass., attended Leicester Academy, and was graduated from Harvard in 1853. He was for several years president of the Hardware Club, New York.

George W. Schluederberg, general manager of the Pittsburgh Coal Co., died at his home in Pittsburgh, April 1, from pneumonia, aged 74. He was widely known as a coal mine expert.

Ambrose E. Lehman, aged 65, Philadelphia, died Thursday after a career devoted almost entirely to engineering, chiefly mining and geological, making many reports on coal and iron properties.

William A. Dunbar, one of the founders of the Dunbar Bros. Co., springmaker, Bristol, Conn., died at his home in that city, April 11, from heart trouble, aged 73 years. He retired from the company in 1890 because of ill health.

George C. Fisk, president of the old Wagon Co., Springfield, Mass., manufacturer of cars, died April 6, aged 86. He began his connection with the company in 1852 and served as president from 1871 until the concern was absorbed by the J. G. Brill Co. in 1907.

Henry B. Cornwall, professor emeritus of Princeton University, died of pneumonia at Princeton, N. J., April 1, aged 73. He graduated from Columbia University, served as assistant in the chemistry department at that institution, later became superintendent for a mining company in Mexico and in 1873 assumed charge of the courses in chemistry and mineralogy at Princeton.

Frank Rockefeller, youngest brother of John D. Rockefeller, and vice president of the Cleveland Steel Co and the Buckeye Steel Castings Co., Columbus, died at Cleveland, April 15, aged 72 years. During his life he had been associated with the late James Corrigan in iron ore properties in the Lake Superior district and in various other enterprises.

John G. Johnson, a leading corporation lawyer, died at his home in Philadelphia Saturday after two days' illness. He was attorney for the Pennsylvania railroad, the Baldwin Locomotive Works and other large corporations, and was counsel for the United States Steel Corporation in its suit still pending before the United States Supreme Court.

George W. Weed, aged 78, prominent New York manufacturer and engineer, died April 8. He was president of the Morgan Iron Works, vice president of the Society of Naval Architects and Marine Engineers, a governor and treasurer of the Engineers' club, member of the General Society of Mechanics and Tradesmen, and for several years was president and director of the New York-Cuba Mail Steamship Co., of the Old Dominion Steamship Co., and of several banks and trust companies.

Silas Hitchcock, formerly a member of M. A. Hanna & Co., Cleveland, died suddenly on a Lake Shore interurban car near Cleveland, April 11, aged 60 years. He had been with the Hanna firm for many years, starting in a lowly capacity. He retired as a member of the firm 12 years ago. Mr. Hitchcock was financially interested in and was a director of various Cleveland corporations.

Charles A. Gregory, founder of the J. H. Gautier Co., manufacturer of crucibles, died at his home in New York City recently. Mr. Gregory was 79 years of age and founded the Gautier company more than 50 years ago. During all of that time he served as its president. His death followed a physical breakdown which he suffered three months ago. This led to his retirement from active business.

John J. Drummond, president of the Zenith Machine Co., Midland, Ont., and a pioneer of the Canadian iron industry, died at Montreal, April 7. He was one of four brothers prominent in metallurgical enterprises, of whom George E. Drummond, of Montreal, is the only survivor. Mr. Drummond was born in Ireland in 1856 and came to Canada when quite young. After a thorough training as a practical engineer, he went to Sweden where he studied the construction and operation of blast furnaces. He visited many iron centers in the United States and Europe. He was one of the first designers and operators of blast furnaces in Canada in connection with the Drummond plants in Quebec province and Nova Scotia and more recently at Midland, Ont. During his 30 years of business life he experienced no labor troubles and was very popular with his employes. Mr. Drummond was active in politics.

James Buchannan Brady, of New York, vice president of the Standard Steel Car Co., died at Atlantic City, April 13, after a long illness, aged 62 years. Mr. Brady possessed an intimate knowledge of railroading and the manufacture of steel cars, which, added to a remarkable natural ability, had given him the reputation of being one of the best salesmen in the United States. He began his life in a lowly railroad position and developed himself until he became a close friend of leading railroad executives. As a young man he became connected with the Fox Pressed Steel Car Co., now the Pressed Steel Car Co. Later he took part in the organization of the Standard Steel Car Co. He was president and director of the Independent Pneumatic Tool Co., director of Manning, Maxwell & Moore, director of the United Injector Co., vice president of the Kieth Car & Mfg. Co., vice president of the Osgood - Bradley Car Co., and a director of other companies along the same lines. Mr. Brady had been a collector of precious stones of all kinds and experienced a great gratification in their possession, which gained for him the sobriquet of "Diamond Jim" Brady, as which he was widely known.

Awarding Submarines

Washington, April 17.—Following the designating of the navy yard at Portsmouth, N. H., for the construction of 10 submarines of the 800-ton class, bids were opened last week at the navy department for 28 more under-sea boats of that type. The Electric Boat Co. submitted bids on four boats for $1,524,000 each for those to be built on the Atlantic coast and $1,592,000 each for those built on the Pacific coast; the California Shipbuilding Co. bid on not less than four nor more than eight on a cost plus profit basis; the Lake Torpedo Boat Co., on not less than four nor more than eight for prices ranging from $1,288,000 each to $1,299,000 each. Schneider & Co., Paris, France, offered to make a contract with the department for the use of detail plans, specifications, etc., for $65,000 on the first vessel, $45,000 on account of each succeeding vessel, or $35,000 for licensing the construction of a heavy oil engine for the first vessel, and $25,000 each for the engines of succeeding vessels.

Government Orders Placed

Orders for $45,000 worth of bits and augurs have been placed by the government with the W. A. Ives Mfg. Co., Wallingford, Conn., which is about to be taken over by the Norfolk Mfg. Co., Norfolk, Conn. The latter also has received a government order for $36,000 worth of the Hugo automatic locking clamps. The Luderers Marine Construction Co., Stamford, Conn., will build for the government five submarine chasers of 110 feet length, 16 feet beam and 30 knots speed.

Installing Furnace

The Hopes Engineering Corporation, Glens Falls, N. Y., is installing an electric furnace for the manufacture of steel castings. A large extension to the foundry is being built to provide space for this department.

Forms Mining Company

Chicago, April 17.—A corporation to be known as the Orwell Mining Co., to be incorporated in Minnesota to operate the Dunwoody mine on the Mesabi range, a Great Northern ore lease held by the Tod-Stambaugh interests is being formed by the Inland Steel Co. The Stambaugh interests probably will hold a large share in the concern. More liberal provisions of the new charter recently obtained in Delaware allows these extensions to make the steel company more independent of outside sources of supply for raw materials.

A tract of 2,000 acres of coal land near Dorseyville, Pa., also has been purchased from the Indianola Coal Co., by the Inland Steel Co., Chicago, and will be developed to supply coal for the 130 by-product ovens of the latter at Indiana Harbor. A railroad will be built, a shaft sunk and town established. The entire output will be used by the steel company.

Revive Idle Plate Mill

The Sharon Steel Hoop Co., Sharon, Pa., expects within a month to have work resumed in a plate mill, at Youngstown, three years idle, of the former Youngstown Iron & Steel Co., which the Sharon company acquired recently. Plates up to 70 inches will be rolled and the daily output is expected to be about 200 tons. The mill is being overhauled and reconstructed.

Purchases Brass Plant

The Bridgeport Brass Co., Bridgeport, Conn., has purchased the plant of the Standard Brass & Copper Tubing Co., New London, Conn., and will operate it hereafter as a branch plant. The New London plant was established about eight years ago for the exclusive manufacture of drawn seamless brass and copper tubing and its original output has been practically doubled. The Bridgeport Brass Co. plans immediately to increase further the capacity.

To Build Sheet Plant

The Liberty Steel Co., Warren, Pa., has been incorporated for $600,000 by Edward F. Clark, son-in-law of Jonathan Warner, president of the Trumbull Steel Co., Warren; Albert Kenworthy, John W. Ford, Harold Taylor and L. A. Manchester, and will make sheets. All of the common stock of $400,000, is reported subscribed. Contracts are being awarded for a plant of six mills on a site containing 100 acres west of Warren. It is intended eventually to have a plant of 36 mills. At the start the company plans to employ 500 men and make 30,000 tons annually of highly finished sheets for automobiles and metal furniture. The company has temporary quarters in the Western Reserve Bank building, Warren.

Building New Additions

The Elyria Iron & Steel Co., Elyria, O., has begun construction of a storehouse and finishing building, 180 x 200, to cost about $200,000; it is to be completed about July 1. A furnace department and a clubhouse are to be added later.

Seeking Foundry Site

Negotiations have been opened with the chamber of commerce of Watertown, Wis., by the Electric Steel Casting Co., Milwaukee, with a view of establishing its proposed new electric steel foundry in that city. The company was organized some time ago with a capital stock of $300,000 by Leo G. Smith, formerly manager of the Prime Steel Co., Milwaukee, and planned to build a large plant in West Allis. Because the company was unable to make a satisfactory arrangement for electrical current in West Allis, it determined to locate elsewhere.

Work New Coke Plant

Coke is being produced in the new 84-oven by-product plant of the Brier Hill Steel Co., Youngstown, O. When working on a 16-hour coking basis the plant is expected to produce about 850 tons daily, ample for the company's two stacks. A benzol plant large enough to care for the by-product output is to be put in operation about May 1.

Engineers Plan Trip

A special trip through the southwestern Missouri lead district is being planned for members of the American Institute of Mining Engineers, who meet in St. Louis next October. The district is located about 80 miles from St. Louis and is the largest in the world. According to the latest figures obtainable, the lead production of the world was 1,270,000 tons in 1913. During that year the output of the United States was 412,000 tons, and of the southwestern Missouri district 133,000 tons. In 1916 the production of the United States was more than 600,000 tons, and that of the Missouri district 184,000 tons, or 32 per cent of the output of this country.

Will Absorb War Risk

The Southern Pacific Railroad Co. has announced that it will absorb the cost of war risk insurance on westbound freight from eastern ports by way of its gulf route. This policy is designed to stabilize conditions in the face of reports of submarine activity on the Atlantic or gulf coasts. Previously shippers have absorbed the risk of sea transportation between Atlantic ports and terminals at New Orleans and Galveston.

Stack is Scrapped

Various old blast furnaces are being pressed into service to meet the unusual demand for pig iron. In contrast to this movement it is interesting to note that some old stacks have been consigned to the scrap heap. The Williamson furnace, Birmingham, Ala., has been sold to scrap dealers and is now being torn down. The one stack, which was abandoned in 1914, was built in 1886 and blown in late that year. It produced foundry and mill pig iron and had an annual capacity of 20,000 gross tons. This stack was active in 1900.

Mill to Start

Operations at the new sheet mill of the Empire Rolling Mill Co., Cleveland, are to be started about May 1, as arrangements have been made for a steel supply. The sheet plant was completed several months ago, but has never been operated. It comprises six hot mills. Not all of these will be started at first.

Break Many Records

The 40-inch blooming mill of the Bethlehem Steel Co. broke its monthly record in March by rolling 35,257 tons. Its best previous monthly output was 32,908 tons, in November, 1916. The bessemer department of the company's Saucon plant broke a record of long standing by producing 41,167 tons in March, compared with its previous monthly record of 39,699 tons. The blast furnace department continues to break records. Furnace E produced 16,578 tons in March compared with 16,221 tons, the best previous record, and furnace F 19,769 tons, against a previous record output of 18,419 tons.

The James A. Brady Foundry Co., Chicago, has bought a site, 266 x 449 feet, at Forty-fifth street and Western avenue. Plans are under way for a new plant, including a foundry and office building, 150 x 360 feet, and a cleaning building, 90 x 135 feet.

Machine Tool Market is on Edge

Many Builders, Holding Plants in Readiness for Any Emergency, Chafe at Delay—New Equipment Being Sought by Munition Makers—Cranes Are in Heavy Demand

MACHINERY builders are literally "up in the air". No one seems to know just what the government will require, not even the government itself. Pending detailed information, most builders are booking private orders conditionally. Some interests have even withdrawn from the market for 30 days. Many plants which have completed or are completing munition contracts for the allies are putting out tentative inquiries for equipment, having in view possible munition orders from the United States. Despite the possibility of such orders, however, another large list of second-hand machine tools, numbering more than 500, many of them lathes, has been offered by W. L. Perkins Jr., 30 Church street, New York City, who is understood to be acting for a railway equipment maker which has been engaged in munition manufacture.

The export inquiry for machine tools is in much larger volume than a few weeks ago. Considerable equipment is being bought and placed in storage in New York pending the return of better ocean freight conditions or the end of the war. A shipment of single purpose lathes has just been received in New York for storage for the Dutch government. Some sales of tools out of storage are noted, owners finding the cost of holding such tools inadvisable. There has been, however, no noticeable effect upon the market as the result of these sales. The domestic market for machine tools is active, orders and inquiries for individual machines of miscellaneous types aggregate a heavy total. Ground has been broken for a large plant at Trenton, N. J., for the Westinghouse Lamp Co. The Stone & Webster Engineering Corporation has the general contract for this work. Builders of conveying equipment report an active inquiry. The government's negotiations in connection with its naval yard expansion program are, of course, predominant. As in the case of machine tools, crane builders do not know exactly what will be required, but they believe there is enough business to fill all plants for months. It is said the League Island yard at Philadelphia will require at least 40 cranes, in addition to the immense 350-ton crane of 100-foot span which is contemplated, while similar expansion is planned at the Brooklyn, Portland and other yards. Private ship builders continue to flood the market with inquiries. Among the latest development is a list issued in connection with a new plant, which will be built on the Atlantic coast at a southern port. This list includes 18 ½-ton cranes, 37-foot span; two 15-ton cranes, 70-foot span; and four 3½-ton wall cranes, 25-foot boom. In addition, this interest has asked bids on a large amount of punching and shearing machinery and other ship yard equipment, involving in all a cost of about $100,000. The General Electric Co. is inquiring for about 15 cranes for its Schenectady plant, ranging in size from 10 to 50 tons. The Crucible Steel Co. is in the market for seven cranes for its Atha Works, ranging in size from five to 50 tons. The Texas Oil Co. has closed an order for equipment for its new tank shop at Port Arthur, Tex. The Fore River Ship Building Co. has closed for the four 10-ton and one 50-ton cranes, for which it recently inquired in connection with its new ways.

Advices from Washington state that bids which were received from munition makers in this country indicated to an astounding degree the capacity of this country for shellmaking. Eleven bidders, out of 25, which submitted estimates, stated that their plants were capable of producing 1,170,000 1-pound shells within the time limit set by the government. Each stated that deliveries could be started within one month from the signing of the contract and shipments would be made at the rate of 100,000 to 500,000 finished shells a month.

The Sterling Motor Co., Brockton, Mass., has received an order for 1,000,000 1-pound shells for the United States government. The daily output will be about 20,000 shells. The company has been making shells for the Russian government.

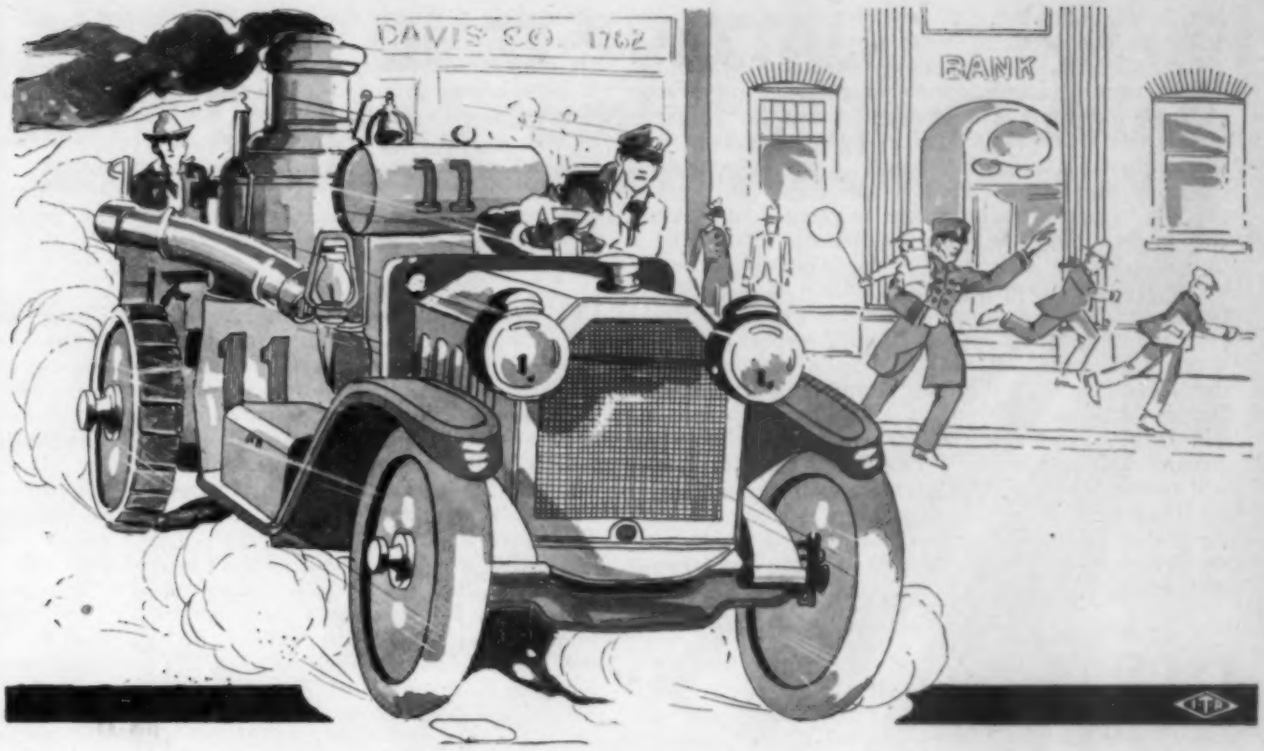
More Shell Contracts for Pittsburgh

ASSURED of the financial support of the United States, the entente nations likely will distribute huge orders for shells in this country at an early date, according to munition makers in the Pittsburgh district. Thousands of machines in western Pennsylvania, now idle, probably will be put into operation within the next 30 days on contracts for this country, England, France and Russia. The Twenty-eighth street and Garrison alley plants of the Westinghouse interests in Pittsburgh, which have completed contracts for shells for the allies, will not be dismantled, as originally intended. Machine tool dealers say they are being called upon to replace a great many machines in munition plants. This presages a revival of activity all along the line. Demand for equipment for domestic purposes continues heavy. The Westinghouse Electric & Mfg. Co. is closing for a number of punches and shears for its new plant at Essington, Pa., and several Steel Corporation subsidiaries are buying single tools for installation in plants in western Pennsylvania and eastern Ohio.

Heavy Machines in Demand in Chicago

INCREASING activity in ship building is bringing a heavy demand for punch and shear equipment as well as for other machines for handling plate work. Dealers find builders of this type of machine, the last to feel the impetus of war conditions, have taken on orders almost to capacity and additional buying is becoming difficult. Buying in small lots continues; railroads are taking some equipment on their recent orders and the Rock Island arsenal requirements seem to have been filled for the present. The Santa Fe railroad continues to ask for a few separate tools from time to time. Armour & Co. have closed for most of the equipment needed for Chicago use but material for the new plant at St. Paul has not yet been placed. Second hand machinery is slow. Few inquiries are being received and the supply of desired types is small. Prices asked for this class of equipment are high and dealers are not buying it for resale.

An advance of 7½ per cent on millers has been



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announced, following a 10 per cent advance on radial drills made a week or more ago.

La Salle, Ill., is planning to expend $150,000 for improvements, including two cross-compound pumps of large capacity. The city of Milwaukee is in the market for a 12,000,000-gallon pumping engine. At Birmingham, Ala., a large sum is to be expended enlarging the North Birmingham light and power plant. Industrial enlargement continues unchecked and keeps up demand for equipment. The Victor Chemical Works, Chicago Heights, is building a power house and the Central Mfg. District of Chicago is planning to build a power house and pipe line tunnel at the Union stock yards. The Freeport Machine Works, Freeport, Ill., is building a machine shop, the Egyptian Iron Works, formerly the Southern Illinois Machine & Foundry Co., Murphysboro, Ill., will build a foundry and car shop for mining car construction, the Missouri Enameling Co., St. Louis, will equip a plant with sheet metal working machines, the Bucyrus Co., South Milwaukee, is adding a machine shop, and the Pennsylvania railroad is planning the erection of a powerhouse and large roundhouse with machine shops at Indianapolis.

Cleveland Dealers Find Ready Market

CLEVELAND machine tool builders are finding a ready market for all types of machine tools. "We can't get the machines; if we could, we could sell today," said one local dealer. Deliveries are about the same, certain tools cannot be had for delivery for two or three months while other machines are coming through from the builders promptly. The Nickel Plate railroad and the New York Central railroad have purchased all the tools on which inquiries were made some time ago. The Ohio Insulator Co., Barberton, O., has not, however, closed for the tools for which it inquired 10 days ago. The list includes a miscellaneous assortment of machines. A middle western builder of bending brakes has raised prices 10 per cent, effective immediately; a Cincinnati builder of milling machines has increased his prices 10 per cent and an Illinois manufacturer has increased prices 7½ per cent on air compressors.

Cincinnati Trade Slows Up

A FALLING OFF of inquiries is noticeable in the Cincinnati machinery market. This is thought to be only temporary, as the situation is hanging in the balance until the government reaches definite conclusions regarding war preparations. It is almost certain that builders of machine tools in Cincinnati will be called upon to furnish equipment for plants that will be operated by the government in the manufacture of munitions. As a result, all are looking for increased activity as soon as congress passes the necessary war measures. The Lunkenheimer Co., Cincinnati, will double the capacity of its shipping department by erecting a new building. The John Steptoe Co., Cincinnati, builder of machine tools, will build a 2-story addition, 59 x 130 feet, that will increase its manufacturing facilities by over one-half. The Ohio Corrugated Co., Warren O., will extend its sheet mill at a cost of $325,000, and the city of Bellefontaine, O., will erect an artificial gas plant to cost $45,000. A gas producer plant, 60 x 108 feet, to cost $40,000, will be built by the Smith Gas Engineering Co., Dayton, O.

New Construction and Equipment

What it is **Where it is** **Who's doing it**

Among New England Factories

CONCORD, N. H.—The Abbott & Downing Co. has increased its capital stock from $100,000 to $200,000.

BOSTON.—The Standard Steel Motor Car Co. has been incorporated with $20,000 capital by John S. Campbell Jr., Butler, Pa., president and Samuel S. Atwell, treasurer and clerk.

BOSTON.—Scott & Williams have been incorporated to make knitting machinery in Laconia, N. H., with $1,750,000 capital by Eugene T. Connolly, president and Stewart C. Woodworth, treasurer and clerk.

BOSTON.—The Hopkins & Allen Machine Gun Co. has been incorporated to do business in Norwich, Conn., with $500,000 capital by Samuel Vaughan, Beverly, Mass., president; Francis R. Boyd, Cambridge, Mass., treasurer and clerk, and John Noble.

BOSTON.—The National Abrasive Co. has been incorporated with $300,000 capital by Nathan C. Harrison, president; Richard C. Harrison, Haverhill, Mass., treasurer and J. T. Johnston.

BOSTON.—The United States government will build a reinforced concrete semi-fireproof, 8-story, 180 x 360-foot storehouse to cost $500,000 at the Charlestown navy yard. Bids will be taken about May 20.

BROCKTON, MASS. — The plant of the M. H. Bates Leather Co. was damaged by fire April 6, with a $100,000 loss.

CAMBRIDGE, MASS.—The Charles Spring & Forge Co. has been incorporated with $10,000 capital by H. G. Davis, president; William F. Bleyer, Allston, Mass., treasurer and H. Nagel.

CHELSEA, MASS.—J. H. McNary, formerly general superintendent of the Magee Furnace Co., will erect a 2-story building, 60 feet in length, adjoining the Acme Foundry, and will make castings. He has purchased the business of the Dighton Furnace Co., Dighton, Mass., established in 1858, and will remove it when the building is completed.

CHICOPEE, MASS.—The factory of the Dana S. Courtney Co. was burned April 6, with a loss of $150,000.

GARDNER, MASS.—Plans are being figured for three brick, 3-story, 60 x 177-foot, 60 x 105-foot and 60 x 97-foot manufacturing buildings for the Central Oil & Gas Stove Company.

HOLYOKE, MASS. — Plans have been drawn for a shop addition for G. Haarmann & Son, Inc. Gustav Haarmann is president.

LYNN, MASS.—General Electric Co. will build a laboratory, 4-stories, 53 x 204 feet, to cost $125,000. Work is about to start.

MALDEN, MASS.—The Eastern Smelting & Refining Co., Charlestown and Somerville, Mass., has purchased 14 acres and will erect a 150 x 400-foot building to cost $100,000, to be devoted to the refining of copper and tin principally. A wharf is planned on the Mystic river and two spur tracks, each 1,000 feet long, will be run in from the western division of the Boston & Maine railroad.

MEDFORD, MASS. — Contracts will be awarded soon for a stone, brick and steel fireproof, 3-story and basement, 65 x 125-foot city hall to cost $500,000.

MILLBURY, MASS. — The Cordis Mills has let contract for a fireproof, 50 x 145-foot addition to its mill on Elm street.

NEW BEDFORD, MASS. — The Passaic Cotton Co. will build a brick, 5-story, 133 x 499-foot with two wings mill which will require about 900 tons of structural steel.

SPRINGFIELD, MASS. — The Franklin Machine & Tool Co. has been incorporated

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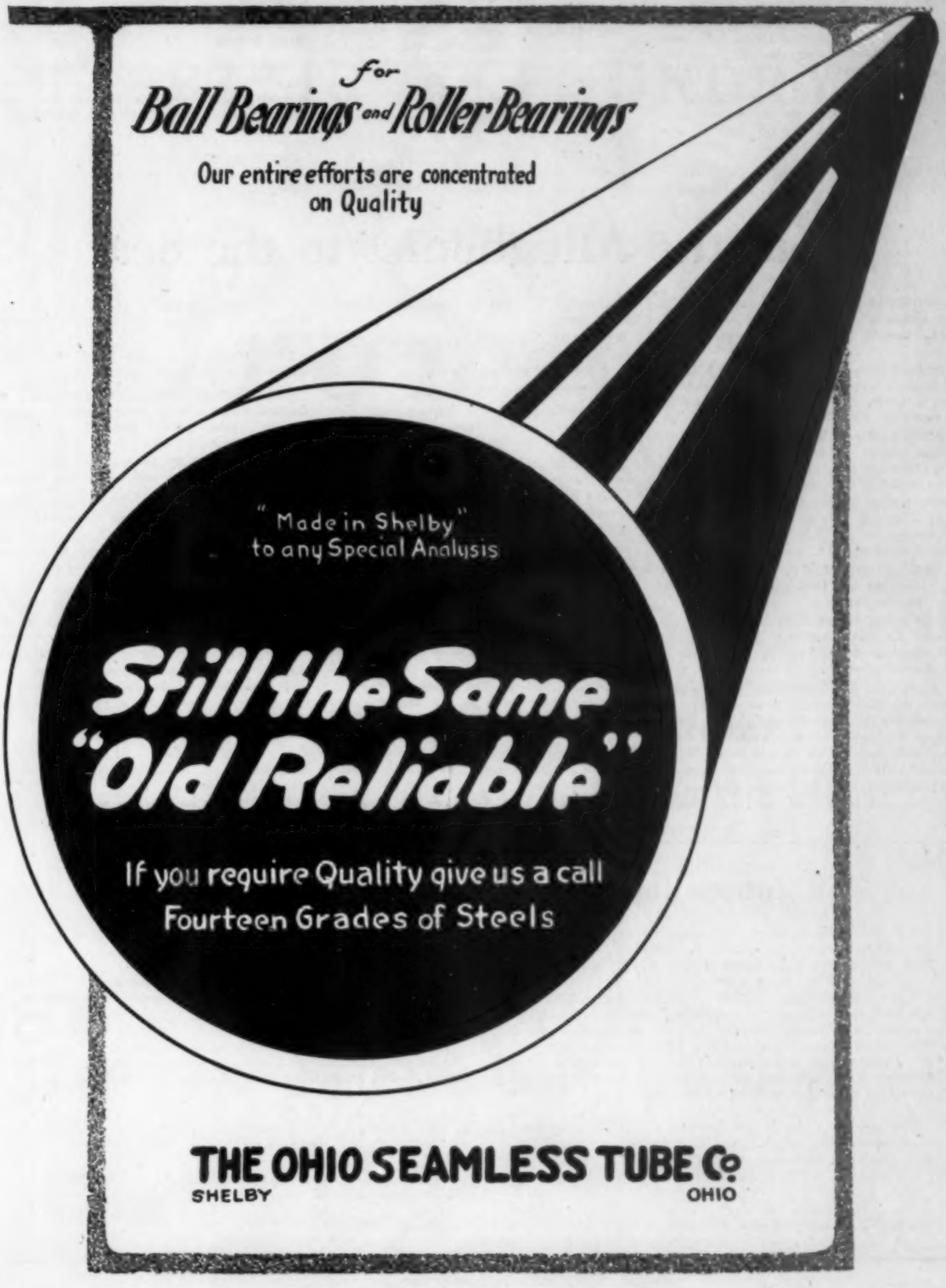
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Say you saw it in THE IRON TRADE REVIEW

with $50,000 capital by Robert A. Johnson, president; Carl R. Molin, treasurer and Oscar S. Johnson, clerk.

SPRINGFIELD, MASS. — The American Saw & Mfg. Co. has purchased a site on which it plans to erect a 1-story, 75 x 200-foot plant to be ready for occupancy about June 15.

WALTHAM, MASS. — The Judson L. Thomas Mfg. Co. maker of rivets, will build a brick, mill construction, 3-story, 50 x 100-foot machine shop.

WORCESTER, MASS.—Eastern Bridge & Structural Co., 88 Crescent street, will build pattern room, 2-story, 45 x 120 feet, to cost $6,500.

WELLS RIVER, VT.—The Adams Paper Co. has let contract for a wood, 1-story, 130 x 150-foot mill and a brick, 1-story, 30 x 30-foot engine house.

ANSONIA, CONN.—American Brass Co. is erecting an addition, 2-story, 40 x 230 and 58 x 320 feet, to cost $150,000. Work has started.

BRIDGEPORT, CONN.—Plans have been drawn for a billet rolling mill for the American Tube & Stamping Co.

BRIDGEPORT, CONN. — The Aberthaw Construction Co., Boston, has been awarded contract for a concrete, fireproof, 5-story, 60 x 250-foot factory to cost $150,000 for the Singer Sewing Machine Co.

HARTFORD, CONN. — The Henry & Wright Mfg. Co. will build a brick, 1-story, 60 x 135-foot addition to its factory.

HARTFORD, CONN.—Brown, Thomson & Co. have let contract for a brick and steel, fireproof, 8-story, 78 x 139-foot addition to cost $250,000.

PLAINVILLE, CONN.—General contract for one of three factory buildings, each 100 x 130 feet for the Marlin Arms Co., has been let to Henry O'Hara, Plainville.

STAMFORD, CONN.—Excelsior Hardware Co. has let general contract for a 2-story plant addition 25 x 50 feet, to E. E. Scofield, 3 Maple avenue.

PROVIDENCE, R. I.—The Abrasive Machine Tool Co. has been incorporated with $150,000 capital by Frank Norman MacLeod, Norman Douglas MacLeod and Elmer Ellsworth Dawson Jr., Boston.

PROVIDENCE, R. I.—The Esmond Mills will build a 100 x 200-foot addition to its plant.

From the Alleghenies to the Sea

BROOKLYN.—Tartar Chemical Co. will build extension 49 x 87 feet, to cost $8,000. W. L. Carey, Ninth street, Brooklyn, has charge.

BROOKLYN.—Architects Cannella & Gallo, 860 Graham avenue, are drawing plans for plant, 3-stories, 30 x 100 feet. The name of the owner is withheld.

BROOKLYN.—Architect Benjamin F. Hudson has revised plans for machine shop, 1-story, 100 x 100 feet, to cost $12,000. The owners name is withheld.

BROOKLYN. — Plant extension to be one and two stories, 25 x 60 feet, is planned to the factory of I. Solomon. Architect is Tobias Goldstone, 50 Graham avenue.

LONG ISLAND CITY, N. Y. — Expert Metal Reducing Co., will build 1-story brick plant, 30 x 76 feet.

NEW YORK.—New York City & Hudson Railroad Co. will build a power station. Chief engineer is George N. Kittredge, 70 East Forty-fifth street.

CAMDEN, N. J.—The board of trade announces the Jos. Pedrick Foundry Co. is a new industry to be established here. The company is erecting a 75 x 78-foot structure on a 2-acre site and is to add other buildings later. It will build cast iron boilers.

ELIZABETH, N. J.—David Kaufman & Sons, iron and metal, will build two plants, one 3-story, 31 x 100 feet, and one 1-story, 53 x 90 feet.

HILLSIDE, N. J.—Bristol Meyers Co., Brooklyn, N. Y., will erect factory building, 100 x 200 feet, in Long avenue for manufacturing laboratory to cost $25,000.

NEWARK, N. J.—The Newark Gear Cutting Machine Co., will build machine shop addition, 1-story, 50 x 50 feet.

NEWARK, N. J. — Architect W. Frank Bower has drawn plans for 1-story plant, to be 100 x 200 feet, and to cost $30,000. Name of owner is withheld.

NEWARK, N. J.—Plans for power house, garage and loft building, one and two stories, 50 x 60 feet and 90 x 100 feet, have been drawn for Wardell's Steam laundry.

NEWARK, N. J.—Factory Supplies, Incorporated, has had plans completed by John B. Acocella for a manufacturing building, 40 x 100 feet, to be erected at 76 Frankfort street.

NEWARK, N. J.—The Frank Theiss Co. is about to start work on the erection of a 46 x 49-foot building at 690 South Twelfth street.

NEWARK, N. J.—The Isbell-Porter Co. has been granted a permit to erect a 1-story, brick boiler house.

NEWARK, N. J.—The Hanson-Van Winkle Co. has been granted a permit to erect an extension to its foundry at 321 Chestnut street.

PATERSON, N. J.—Doherty & Wadsworth will build boiler house, 1-story, 50 x 50 feet.

PAULSBORO, N. J.—Harrison Bros. & Co. are taking subbids on an acid building to be two stories, 10 x 80 feet. A. R. Clancy is general superintendent.

PAULSBORO, N. J.—Standard Fuse Corporation will erect an addition to cost $42,000.

PLAINFIELD, N. J.—The Standard Aero Co. has plans for an addition 80 x 100 feet.

TRENTON, N. J.—William R. Thropp & Sons Co. will erect a 1-story brick machine shop on East State street.

TRENTON, N. J. — The Trenton Gas & Electric company will erect a 2-story brick filtration plant and two 1-story additions to its plant on New York avenue to cost $9,500.

TRENTON, N. J.—The C. V. Hill Co., manufacturer of refrigerators and store fixtures, has added automobile delivery bodies to its products. To equip a new department, the company has placed on the market an issue of $100,000 preferred stock.

ALLEGHENY, PA. — Pennsylvania lines west will build brass foundry extension, 1-story, 50 x 50 feet.

ERIE, PA.—General contracts for a $1,000,-

Interesting Bits of News of the Industry

The Gibb Instrument Co. has moved its offices and laboratories from the Highland building, Pittsburgh, to 5716 Euclid avenue, Cleveland.

* * *

The United States Metal Culvert Association announces that it now is occupying the law offices of Samuel M. Dague, counsel for the association, room 977, 208 South La Salle street, Chicago. Secretary A. W. Dowler now is connected with the Wheeling Steel Casting Co., Wheeling, W. Va., and President C. L. Carter is residing at Fort Dodge, Ia.

* * *

The offices of the B. M. Gardner Co., Cleveland, have been removed to 321-322 Guardian building. The Gardner company has also opened a branch office at 704 Ford building, Detroit, in charge of C. E. Conover.

* * *

The Philadelphia Steel & Forge Co., with works at Tacony, Pa., has changed its name to the Tacony Steel Co. There will be no change in the personnel of the company.

* * *

F. F. Chadwick & Co. have opened offices at 1111 Land Title building, Philadelphia, to engage in a general coal and coke business.

* * *

The Chicago office of the Central Steel Co., of Massillon, O., A. Schaeffer, district representative, will remove, May 1, to 1370 Peoples Gas building, 122 South Michigan avenue.

* * *

The Protecto Co., Bridgeport, Conn., has changed its name to the American Iron & Steel Corporation.

* * *

Block & Co., composed of Louis Block and Harry Cohen, have opened offices at 409 Monadnock building, Chicago. The company will deal in waste materials, including metals.

If You wish to improve your

BASIC and FOUNDRY

IRONS

YOU NEED OUR

Iron Ore

Crawford Ore

Lambert Ore

Pennington Ore

from Our Open Pit Mines

Our iron ores insure ***quality;*** quality means satisfaction; satisfaction means "repeat" orders—and that's what makes a big business and ***keeps*** it big.

"New" business may furnish a living, but it takes the ***"repeaters"*** to bring ***real success.***

The Tod-Stambaugh Company

Perry-Payne Building

CLEVELAND - - OHIO

000 extension to the plant of the Erie Forge Co., have been awarded to the Lackawanna Bridge Co., Buffalo.

GREENVILLE, PA.—The Greenville Steel Car Co. has acquired a 50-acre site and plans to build a large plant.

HAZELTON, PA.—The Wilmot Engineering Co., Whitehaven, Pa., is about to erect office building.

PHILADELPHIA.—Excavating is about to start on a boiler-plant extension, 1-story, 58 x 107 feet, for Robert H. Foerderer

PHILADELPHIA. — Preliminary work is being done on a power house and loft building, 8-story, 120 x 236 feet, for Hale and Hilburn.

PHILADELPHIA. — Henry Disston & Sons, Inc., have conveyed to the Henry Disston & Sons File Co., a site of about 215 acres at the corner of Unruh and Wissinoming streets.

BALTIMORE.—Consolidated Gas, Electric Light & Power Co., is taking subbids on electric generator plant, 100 x 100 feet. J. H. Badenkopf, Lexington street, is in charge of all purchases.

Activities in the Central States

BATAVIA, N. Y.—Fire caused by an explosion of chemicals in the factory of the Batavia Clamp Co. caused a loss of $15,000.

BUFFALO.—Plans have been drawn for an addition to the machine shop of the Barber Asphalt Paving Co., to be 1-story, 46 x 68 feet, and to cost $12,000.

BUFFALO.—The Kittinger Furniture Co. has awarded the Hydro Construction Co., 1010 Mutual Life building, a contract to erect a 2-story furniture factory, 75 x 220 feet.

ENDICOTT, N. Y.—The Endicott-Johnson Co. plans to erect a 3-story bank and office building, 85 x 100 feet. Mather & Carlton, O'Neill building, Binghamton, N. Y., are preparing the plans.

ESOPUS, N. Y.—The Overseas Engineering Corporation has been organized with $10,000 capital to manufacture mechanical equipment and metal products, by G. Santi, F. E. and C. E. Dickey, 233 Broadway, New York.

GENEVA, N. Y.—The Standard Optical Co. plans to erect a 2-story factory and office building, 50 x 136 feet. Gorden & Madden, 300 Sibley building, Rochester, N. Y., are preparing the plans.

JAMESTOWN, N. Y. — The Chautauqua County National bank has awarded the Fox-Davis Mantel Co., 652 Main street, Buffalo, a contract to build an addition to its building. Phillips, Fidler & Beck, Warren Trust Co. building, Warren, Pa., are preparing the plans.

LACKAWANNA, N. Y.—The Lackawanna Trust Co. and the Lackawanna National bank have awarded Mosier & Summers, 1266 Seneca street, Buffalo, a contract to erect a bank building, 40 x 110 feet, to cost $40,000. Neal Dunning, Builders' Exchange building Buffalo, is preparing the plans.

NORTH TONAWANDA, N. Y. — General contract for a boiler house addition, for R. Wurlitzer, 701 North Main street, to be 1-story, 18 x 30 feet, has gone to the Turner Construction Co., Presidential building, Buffalo.

ROCHESTER, N. Y.—Architects Crandall & Strobel, 401 E. & B. building, are drawing plans for 2-story plant, 79 x 128 feet, for Taylor & Shanty.

ROCHESTER, N. Y.—The L. F. Dingler Machine Co. has been incorporated with $10,000 capital, to manufacture machinery, tools and engines, by F. B. Messmer, and L. F. Dingler.

ROCHESTER, N. Y.—General contract has been awarded to H. Stallman & Sons, 58 Builders Exchange for a 1-story boiler house, 48 x 72 feet, for the Co-operative Foundry Co., Lincoln avenue.

SOLVAY, N. Y.—H. D. Best Co., 52 Vanderbilt avenue, New York City, has taken general contract for $150,000 plant for Pass & Seymour, this city.

SYRACUSE, N. Y.—Contracts have been let for an addition to the foundry of the Syracuse Malleable Iron Works, to be 1-story, 87 x 183 feet, and to cost $15,000. Burns L. Smith is president.

WEST, N. Y.—Fred Coch will erect a 2-story plant, 50 x 74 feet, to cost $18,000, for metal work.

ALLIANCE, O.—Fire which broke out in the furnace room damaged the plant of the American Steel Foundries to the extent of several thousand dollars.

CINCINNATI. — Architects Dittoe, Fahnstock & Ferber have plans for an addition to the plant of the Fosdick Machine Tool Co. A larger addition is contemplated in the near future to be of brick construction 30 x 250 feet.

CINCINNATI.—The Nydia Bank Lock Co. has increased its capital stock from $50,000 to $150,000. The company is operating a plant on Elm street, this city, and plans improvements and extension of business. Edgar M. Benham is president.

CLEVELAND.—The Wald Realty Co. has filed plans for a factory building, 115 x 164 feet, to be erected at 1765 East Twenty-second street at a cost of $65,000.

EAST LIVERPOOL, O.—A factory, two stories, 100 x 200 feet, to cost $40,000, will be built by Potters' Mining & Milling Co. Work will start in about a month.

KENTON, O.—The Tullis-Conklin Co. has been incorporated with $10,000 capital to do sheet metal work by E. L. Conklin, R. H. Abbott, D. L. Tullis and M. F. Gilmore.

PERRYSBURG, O.—The National Wheel Co. has increased its capital from $33,800 to $125,000.

TOLEDO, O. — The Advance Machinery Co. has increased its capital from $100,000 to $200,000.

WARREN, O. — The West Side Improvement Co. plans to erect a 2-story store and office building to cost $25,000. J. L. Decker, Stambaugh building, Youngstown, O., is preparing the plans.

YOUNGSTOWN, O. — The Fisher-Gilder Cartage & Storage Co. plans to erect a 6-story warehouse building.

HUNTINGTON, W. VA.—John S. Farr plans to erect a 7-story hotel, 70 x 120 feet to cost $100,000. Meanor & Sweeney, R. & P. building, are preparing the plans.

SOUTH BUCKHANNON, W. VA.—The Triangle Mfg. Co. has been organized with a capital stock of $10,000 to manufacture packing cases, by A. L. Harper, Weston, W. Va.; J. S. Ocheltree, Roanoke, Va.; N. C. Weese, Palmer, W. Va.; F. L. Williams and F. P. Scott, Buckhannon.

LEXINGTON, KY. — The Southern Machinery Exchange is asking for price on a 70-horsepower horizontal tubular or firebox boiler for 125 pounds pressure.

LOUISVILLE, KY.—The Louisville Car & Foundry Co. has been incorporated at $10,900, by C. H. Schimpeler, Charles Schimpeler and Henry Schimpeler.

PADUCAH, KY. — Bids will be received about May 1 for 150 bridges from 6 feet to 100 feet in length. G. Singleton is county clerk.

EAST CHICAGO, IND. — The Famous Mfg. Co. has increased its capital stock from $205,000 to $305,000.

ELKHART, IND. — The Metal Forming Corporation has been incorporated with $200,000 capital to smelt and forge metals by E. C. Harter, E. B. Zigler and W. F. Stanton.

FORT WAYNE, IND.—S. F. Bowser & Co., tank manufacturers, have increased their capital from $200,000 to $1,250,000.

INDIANAPOLIS.—The Peerless Foundry Co. has increased its capital from $4,500 to $100,000.

INDIANAPOLIS.—The Pennsylvania Railway Co., W. C. Cushing, chief engineer, Pittsburgh, will receive bids about May 1 on a 30-stall round house, machine shops, repair shops, power houses and yards for 4,000 freight cars, at an estimated cost of $500,000.

INDIANAPOLIS. — The C. H. Anschutz Mfg. Co. has been incorporated with $30,000 capital by C. H. Anschutz, and others of Wilson, Kas.

LAPORTE, IND.—The Northern Foundry Co. has been incorporated with $15,000 capital by B. C. Rees, and F. A. Krause.

LAWRENCEBURG, IND.—The city council has granted a franchise to the Newton Water Co. to build a water works plant costing $25,000.

MARION, IND. — The Gould Motor & Mfg. Co. has been incorporated to manufacture motors and aeroplanes with $100,000 capital by Frank Barr, J. A. Hartman, and George W. Unger.

MISHAWAKA, IND. — The St. Joseph county commissioners are planning to build a bridge over the St. Joseph river to cost $85,000.

WORTHINGTON, IND. — The Anderson Steam Vulcanizer Co. has been incorporated with $10,000 capital, to manufacture vulcanizers. N. M. Anderson is president.

CAIRO, ILL.—Plans are under way for the erection of a "Y" bridge over the Ohio and Mississippi rivers at Cairo. Wilford W. Beach, Huron, S. D., is interested.

CHICAGO. — The Jackson, Schmitz & Shanks Mfg. Co., a newly incorporated company with $20,000 capital, will begin manufacturing operations soon at 11 South Desplaines street, producing excavating machinery specialties. A. Schmitz, Appleton, Wis., is president.

CHICAGO. — The A. F. Anderson Iron Works has been incorporated with $25,000 capital by A. F. Anderson and Bernard N. Anderson.

CHICAGO.—Davidson & Weiss, 53 West Jackson boulevard, are taking bids for a machine shop 62 x 230 feet, and a forge shop 32 x 60 feet, at an estimated cost of $45,000 for the Campbell Transmission Co., 133 West Washington street. The buildings are to be erected at Buchanan, Mich.

CHICAGO.—The Ely Vermillion Iron Co. has obtained a Delaware charter with $1,500,000 capital, the incorporators being John F. Mahon, Chas. R. Cole and Marion Luce, of Chicago.

CHICAGO.—The American Tool & Machine Co. has been organized with $15,000

capital stock. The incorporators are Clarence Cate, B. H. Rendull and E. A. Rotter.

CHICAGO.—Armour & Co. are planning to build a pumping house to cost $45,000.

FREEPORT, ILL.—The Freeport Machine Works has bought a site and will start plans to build a machine shop 40 x 120 feet.

LA SALLE, ILL. — The city council is planning a water works system including a building, engine and two cross-compound vertical pumps of 3,000,000 gallons capacity each, at an estimated cost of $150,000. O. G. Cypher is engineer.

MURPHYSBORO, ILL. — The Southern Illinois Machine & Foundry Co. has changed its corporate name to the Egyptian Iron Works. Plans are being made for the erection of a new foundry building and shop for the manufacture of mining cars, and other equipment. H. A. Bastien is secretary.

SPRINGFIELD, ILL.—The Racine-Sattley Co., manufacturer of farm implements, will build additions. R. C. Bennett is chief engineer.

KENOSHA, WIS. — The Simmons Co., steel beds and springs, has engaged Architect N. M. Dunning, 35 South Dearborn street, Chicago, to prepare plans for a new administration and engineering building, to cost about $125,000. It will be 75 x 150 feet, two and three stories high, of brick, steel and concrete. James Ferris is general superintendent.

NEENAH, WIS. — The Neenah Brass Works contemplates the erection of a foundry and machine shop addition.

MILWAUKEE. — The Eslein Sheet Metal Works Co. has increased its capital from $10,000 to $30,000.

MILWAUKEE.—The South Side Malleable Castings Co. is building a foundry 120 x 150 feet, core room 40 x 75 feet, storage bins 75 x 650 feet and other additions. Fred A. Lange is president and general manager.

MILWAUKEE. — The Beutlich Canning Machinery Co. has been incorporated with $10,000 capital by Richard F. Beutlich, and Albert J. Muckerheide.

MILWAUKEE.—The Milwaukee Corrugating Co., Lewis Kuehn, president, Thirty-sixth and Burnham streets, will build a steel, brick, and concrete factory addition 120 x 250 feet to cost $40,000. Klug & Smith, Mack Block, are engineers.

MILWAUKEE.—The department of public works, Fred G. Simmons, commissioner, is calling for bids for furnishing and erecting one 12,000,000-gallon pumping engine in the North Point station of the waterworks system. Bids close Wednesday, May 2, at 10:30 o'clock a. m. Bond of $36,000 or certified check of $18,000 is required.

RACINE, WIS. — The Hercules Mfg. Co. has been organized by J. M. Scott, Laurence J. Berkeley and C. C. Gittings to build and market forging machines and other equipment. The capital stock is $50,000.

RACINE, WIS.—The Racine Auto Tire Co. will build the first unit of its plant, 160 x 260 feet. L. Wright, Racine Sattley building, is secretary-treasurer.

SHEBOYGAN, WIS.—O. B. Joerns, president of the Joerns Bros. Mfg. Co. has announced that the company will erect a new bookcase and table factory costing about $100,000.

SUPERIOR, WIS.—The Globe Ship Building Co. is in the market for equipment, including shears, punches and rolls.

JACKSON, MICH. — The Walcott Lathe Co. has increased its capital from $100,000 to $700,000.

ST. JOSEPH, MICH.—The Industrial Foundry Co. is building an addition 40 x 150 feet. J. Stausta is president.

Mississippi to the Rockies

BALDWIN, KAS.—An election will be held soon to authorize $20,000 in bonds for a municipal electric light and water works plant.

CHANUTE, KAS.—Plans have been made by Black & Veach, engineers, Kansas City, Mo., for water works system, including a 150,000-gallon tank on steel tower and 25,000 feet of cast iron pipe.

KALISPELL, MONT.—It is reported that the Great Northern railroad will construct a line between this place and Libby.

WAYNOKA, OKLA. — The county will build a bridge over the Cimarron river, costing $50,000.

CLIFTON, ARIZ.—Bids will be received until May 4 by M. Danehauer, clerk of the town council, for two steel bridges.

POCATELLO, IDAHO. — The Pocatello Foundry & Machinery Co. has been incorporated with $25,000 capital.

MARION, IA.—Bids will be received until April 23 by the county auditor for three pony truss bridges and six I-beam bridges in Linn county. H. M. Hansen is engineer.

ST. LOUIS.—The St. Louis Machine Tool Co., manufacturer of tapping machines and chucks, grinding and polishing machines, plans to build a plant this spring and wants catalogs of materials and equipment used in an up-to-date machine tool plant.

ROCKWELL, IA.—The Gunn Road Mfg. Co., recently incorporated, will build a factory 60 x 120 feet.

SIOUX CITY, IA.—The Pinslow Estate has let a contract for a machine shop and garage to cost $30,000.

The Pacific Coast States

EPHRATA, WASH. — Plans for enlarging the light and power system are under way. A new plant is to be installed by Mr. Nelson at a cost of about $10,000.

MT. VERNON, WASH.—W. E. Costello, county engineer, is making plans to add a 220 foot steel span and new piers to the Mt. Vernon bridge at a cost of $33,000.

SEATTLE.—The Kilbourne & Clark Mfg. Co. has been incorporated with $1,500,000 by Charles A. Kilbourne, and Fred G. Simpson.

SEATTLE.—Bids will be received by C. E. Dole, Alaskan engineering commission, Bell street dock, up to April 23 for one steam-driven suction dredge.

SPOKANE.—The burned plant of the Gray Mfg. Co. is to be rebuilt at a cost of $90,000.

FAIRFIELD, CAL.—The Strauss Bascule Bridge Co., Chicago, is preparing plans for a bridge over the Sacramento river to cost $150,000.

OROVILLE, CAL.—The U. S. Exploration Co. will build a mill and power plant at Granite Basin mine.

MODESTO, CAL. — The board of public service commissioners will buy a site and build a pumping station. William Mulholland is general engineer.

SANTA ANA, CAL.—John Turner, 620 East Sixth street, will build a foundry at Cedar and First streets.

SANTA BARBARA, CAL.—The board of supervisors will build two bridges to cost $50,000.

The Dominion of Canada

LONGUEIL, QUE. — The Stowell Screw Co., 70 St. Ambroise street, Montreal, has completed arrangements for the erection of a plant at Longueil to cost $13,000.

DUNDAS, ONT. — The Chapman Engine Co. will commence at once on the erection of a new plant at Dundas to replace the one damaged by fire a short time ago. New equipment will be purchased.

LONDON, ONT.—The McClary Mfg. Co., stove manufacturer, will build an addition to its London factory to cost $40,000, three stories, brick construction. W. M. Gartshore is manager.

MOUNT BRYDGES, ONT. — The Crow Motor Co. will erect a plant at London, Ont., to cost $100,000. A. E. Eisenbach, Mount Brydges is manager.

PORCUPINE, ONT.—The Northern Canada Power Co. is building a large addition to its plant and will install considerable new equipment.

TORONTO.—The Hesco Co., 210 Adelaide street west, is in the market for a No. 3 stamping press for stamping metal parts.

TORONTO. — Building Systems Co. will build a 7-story mill and brick construction factory at 52 Spadina avenue, to cost $70,000.

TORONTO. — J. J. Walsh, 26 Adelaide street west, will build a 3-story mill and brick construction factory at 626 King street west, at a cost of $50,000.

MOOSE JAW, SASK.—The Robin Hood Mills Co. will build an addition to its plant at Moose Jaw to cost $100,000.

SASKATOON, SASK.—The Quaker Oats Co. proposes to build a large plant at Saskatoon including a plant for the manufacture of coal gas. Machinery will be purchased.

NEW WESTMINSTER, B. C.—The Hopkins Boiler Works has been incorporated to manufacture boilers, machinery, tools, etc., with $10,000 capital.

VANCOUVER, B. C.—The Vancouver Engineering Works has been incorporated to carry on a general foundry and machine shop business with $1,000,000 capital.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery this year.)

Bessemer valley	$40.00
Bessemer, Pittsburgh	42.95
Basic, Pittsburgh	40.95
Basic, eastern Pa.	38.00 to 40.00
Basic, Buffalo	39.00 to 40.00
Malleable, Pittsburgh	39.95 to 40.95
Malleable foundry, Chicago	39.00 to 40.00
Malleable foundry, Philadelphia	41.00 to 43.00
Malleable foundry, Buffalo	39.00 to 40.00
No. 1X foundry, Philadelphia	42.25 to 43.25
No. 2 foundry, Pittsburgh	39.95 to 40.95
No. 2 foundry, Cleveland	39.30 to 40.30
No. 2 foundry, Ironton	38.00 to 40.00
No. 2 foundry, Chicago	39.00 to 40.00
No. 2X foundry, Philadelphia	41.75 to 42.75
No. 2X foundry, N. J. tidewater	41.75 to 42.75
No. 2X foundry, Buffalo	40.00
No. 2 plain, Philadelphia	41.50 to 42.50
No. 2 plain, N. J. tidewater	41.50 to 42.50
No. 2 plain, Buffalo	39.00
No. 2 southern, Birmingham	35.00 to 37.00
No. 2 southern, Cincinnati	37.90 to 39.90
No. 2 southern, Chicago	36.00 to 38.00
No. 2 southern, Phila. delivery	40.00 to 40.50
No. 2 southern, Cleveland	39.00 to 40.00
No. 2 south'n, New York docks	39.25 to 40.25
No. 3 southern, Boston docks	39.50 to 40.50
No. 2 south. interior, New Eng.	40.00 to 41.00
No. 2 southern, St. Louis	35.40 to 40.00
Virginia, No. 2X, furnace	40.00
Virginia, No. 2X, Philadelphia	42.75
Virginia, No. 2X, Jersey City	43.00
Virginia, No. 2X, Boston points	43.25
Gray forge, eastern Pa.	38.00 to 38.50
Gray forge Pittsburgh	38.95
Gray forge, Birmingham	34.00
Silveries, 8 per cent, furnace	46.00 to 48.00
Silveries, 8 per cent, Chicago	45.00
Low phos. Standard, Phila	76.00 to 78.00
Low phos. Lebanon, Pa., furnace	70.00 to 75.00
Low phos., Pittsburgh	60.00 to 61.00
Charcoal, Lake Superior, Chgo.	40.00 to 43.00
Charcoal, Buffalo	40.00 to 42.00
Charcoal, Birmingham	27.00 to 28.00

IRON ORE

Lake Superior Ores.	Lower Lake Ports.
Old range Bessemer, 55 per cent, ton	5.95
Mesabi Bessemer, 55 per cent, ton	5.70
Old range non-Bess., 51½ per cent, ton	5.20
Mesabi non-Bess., 51½ per cent, ton	5.05

Port Henry Ores. Per unit delivered eastern Pa. All non-Bessemer.

Old Bed, crude, 58 per cent.	10.50c to 11.00c
Old Bed, concent., 65 per cent	11.00c to 11.50c
Harmony concent., 63 per cent	11.50c to 11.75c
Lump (at mines)	$5.75

COKE

(At the ovens.)

Connellsville furnace	$7.50 to 8.00
Connellsville fur., cont.	7.00 to 8.00
Connellsville foundry, contract	8.00 to 9.00
Connellsville foundry	9.50 to 10.00
Wise county furnace, contract	6.50 to 9.00
Wise county foundry, contract	7.00 to 10.00
Pocahontas furnace, contract	6.50 to 9.00
New River foundry, contract	7.00 to 10.00
New River furnace, contract	6.50 to 9.00

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, delivered prompt	$400 to 425
Ferro manganese, 80 per cent, seaboard and del'd, contract	nominal
Spiegel, 20 per cent furnace remainder of year	75.00
Ferro-silicon, 50 per cent, Pbgh., nominal	175 to 225

Bessemer ferro-silicon, 9 per cent, $59.00; 10 per cent, $60; 11 per cent, $62.50; 12 per cent, $65; 13 per cent, $70.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billets, Phila.	$75.00 to 80.00
Forging billets, Philadelphia	100.00
Forging billets, Pbgh., nominal	100 to 115
Forging billets, Chicago	70.00
Wire rods, Pittsburgh	85.00
Bessemer billets, Youngstown	75.00 to 78.00
Bessemer billets, Pittsburgh	75.00 to 78.00
Open hearth billets, Pittsburgh	75.00 to 78.00
Open hearth billets, Youngstown	75.00 to 78.00
Bess. sheet bars, Youngstown	75.00 to 80.00
Op. h'th sheet bars, Youngstown	75.00 to 80.00
Bess. sheet bars, Pittsburgh	75.00 to 78.00
Open hearth sheet bars, Pbgh.	75.00 to 78.00
Muck bars, Pittsburgh	60.00
Grooved steel skelp	3.60c
Sheared steel skelp	4.50c

RAILS AND TRACK MATERIAL

(Gross tons.)

Stand. Bes. rails, Pbgh. & Chgo.	$38.00
Stan. op.-h'th rails, Pbgh. & Chgo.	40.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (all rail)	6.15
New York (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:—	
Minneapolis-St. Paul	$1.25
Mayville, Wis:—	
Minneapolis-St. Paul	$1.75

Light rails, 8 to 10 lbs., Pbgh.	58.00
Light rails, 8 lb., Chicago	58.00
Light rails, 12 to 14 lbs., Pbgh.	57.00
Light rails, 12 lbs., Chicago	57.00
Light rails, 16 to 20 lbs., Pbgh.	56.00
Light rails, 16 to 20 lbs., Chgo.	56.00
Light rails, 25 to 45 lbs., Pbgh.	55.00
Light rails, 25 to 45 lbs., Chgo.	55.00
Relaying rails, standard, Pbgh., and Chicago	$38.00 to 40.00
Relaying rails light, Chicago	40.00
Relaying rails, light, St. Louis	48.00 to 51.00
Spikes, railroad, Pittsburgh	3.65c
Spikes, railroad, Chicago	3.70c to 3.80c
Track bolts, Pittsburgh	5.50c to 8.00c
Track bolts, Chicago	4.50c to 4.60c
Tie plates, Chicago	$60.00 to 65.00

SHAPES, PLATES AND BARS

Structural shapes, con. Pbgh.	3.60c
Structural shapes, Philadelphia	3.759c to 4.409c
Structural shapes, New York	3.769c to 4.419c
Structural shapes, Chicago	3.79c to 4.50c
Tank plates, Chicago	4.69c to 6.50c
Tank plates, Pittsburgh (con.)	4.50c to 4.75c
Tank plates, Pittsburgh	5.00c to 5.50c
Tank plates, Philadelphia	4.659c to 7.159c
Tank plates, New York	4.669c to 7.169c
Bars, soft steel, Chicago	3.54c to 4.00c
Bars, soft steel, con. Pbgh.	3.35c
Bars, soft steel, New York	3.519c to 3.919c
Bars, soft steel, Philadelphia	3.509c to 3.909c
Hoops, carloads, Pbgh. contr.	4.10c to 4.25c
Hoops, Pittsburgh	4.25c to 4.50c
Bands, Pittsburgh	4.10c to 4.35c
Bands, Pittsburgh (contr.)	3.35c
Shafting, Pbgh. contr. carloads	10 to 5 off
Bar iron, Chicago	3.25c
Bar iron, Philadelphia	3.659c
Bar iron, Cleveland	3.00c
Bar iron, New York	3.669c
Bar iron, Pittsburgh	3.25c to 3.50c
Hard steed bars, Chicago	3.25c
Cut nails, Pittsburgh	3.50c

SHEETS

(In cents per pound.)

(Open hearth material takes 25c above prices of bessemer.)

SHEET MILL BLACK.

Gage.	Bessemer.
17 to 21	5.30 to 7.30
22 to 24	5.35 to 7.35
25 and 26	5.40 to 7.40
27	5.45 to 7.45
28	5.50 to 7.50
29	5.55 to 7.55
30	5.65 to 7.65

TIN MILL BLACK.

Gage.	Bessemer.
15 and 16	5.20 to 7.20
17 to 21	5.35 to 7.35
22 to 24	5.40 to 7.40
25 to 27	5.45 to 7.45
28	5.50 to 7.50
29	5.55 to 7.55
30	5.60 to 7.60

GALVANIZED.

Gage.	Bessemer.
10 and 11	6.50 to 8.00
12 to 14	6.60 to 8.10
15 and 16	6.75 to 8.25
17 to 21	6.90 to 8.40
22 to 24	7.05 to 8.55
25 and 26	7.20 to 8.70
27	7.35 to 8.85
28	7.50 to 9.00
29	7.75 to 9.25
30	8.00 to 9.50

BLUE ANNEALED.

Gage.	Bessemer.
3 to 8	5.50 to 7.00
9 to 10	5.50 to 7.00
11 to 12	5.50 to 7.00
13 and 14	5.50 to 7.00
15 and 16	5.50 to 7.00

No. 28 black, Chicago	6.69c
No. 28 galvanized, Chicago	7.19c to 7.69c
No. 10 blue annealed, Phila.	6.659c
No. 10 blue annealed, Chicago	6.19c

TIN PLATE

Tin plate, 100 lb., coke base, contract	7.50c to 10.50c
Tin plate, coke base, prompt	8.50c to 10.50c
Terne plate, I. C.	7.15c to 8.00c
Terne plate long	8.00c

IRON AND STEEL PIPE

(Price adopted April 2, 1917.)

Steel.

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛, ¼ and ⅜, butt	48	21½
½, butt	52	37½
¾ to 3, butt	55	41½
2, lap	48	35½
2½ to 6, lap	51	38½
7 to 12, lap	48	34½
13 and 14, lap	38½	....
15, lap	36	....

Iron.

(Prices adopted April 2, 1917.)

Standard weight, threads and couplings, diam. in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ and ¼, butt	36	9
⅜, butt	37	10
½, butt	41	23
¾ to 1½, butt	44	28
1¼, lap	29	14
1½, lap	36	22
2, lap	37	23
2½ to 6, lap	38	26
7 to 12, lap	37	25

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	36

IRON AND STEEL PRICES

Corrected up to Tuesday noon

WIRE PRODUCTS

(Retailers' prices 5 cents above jobbers' quotations).

Wire nails, jobbers', Pittsburgh	$3.20 to 3.50
Coated nails	3.10 to 3.40
Plain wire, jobbers', Pittsburgh	3.15 to 3.45
Galvanized wire, jobbers', Pbgh	3.85 to 4.15
Polished staples, Pbgh	3.35 to 3.65
Galvanized staples, Pbgh	4.05 to 4.35
Barb wire, painted jobbers', Pbgh.	3.35 to 3.65
Barb wire, galv., jobbers', Pbgh	4.05 to 4.35

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts ⅜ x 6 inches, smaller or shorter, rolled thread, 40; cut threads, 35 and 2½, larger or longer, 25.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter rolled 40 and 10; cut, 40; larger or longer, 30.

Cold pressed, semi-finished hexagon nuts, 50 and 10.

Gimlet and cone point lag bolts, 45. Hot pressed square nuts, blanks, $2.10 off; tapped $1.90 off. Hot pressed hexagon nuts, blank, $1.60 off; tapped, $1.40 off.

Cold pressed square nuts, blank, $1.70 off; tapped, $1.50 off. Cold pressed hexagon nut, blank, $1.60 off; tapped, $1.40 off.

RIVETS

Structural rivets Pbgh	**4.75c**
Boiler rivets, Pbgh	**4.85c**
Tinner's rivets, 40 and 10 off, Pittsburgh.	

STEEL SHEET PILING

(Pittsburgh).

Base sizes	3.35c

STANDARD STEEL CHAIN

Chain, ⅜ inch proof coil	7.00c

COLD ROLLED STRIP STEEL

Base price, 7.00c to 8.00c per 100 pounds, hard, coils 1½ inches and wider and by .100 inch and heavier.

CAST IRON WATER PIPE

Four-inch, Chicago	$58.50
Six-inch and larger, Chicago	55.50
Six-inch Class B, New York	50.50
Four-inch Class B, New York	53.50
Four to six-inch, Birmingham	48.00 to 50.00
Six-inch and larger, Birmingham	44.00 to 46.00

Light weight water and gas pipe $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	4.25c
Steel bars, Cleveland	**4.35c**
Steel bars, Detroit	4.25c
Steel bars, Philadelphia	4.50c
Steel bars, New York	**4.35c**
Steel bars, St. Louis	4.30c
Steel bars, Cincinnati	4.35c to 4.45c
Steel bars, St. Paul	4.35c
Steel bars, over 2-in., Buffalo	**4.50c**
Steel bars, Buffalo	**4.40c**
Iron bars, Chicago	4.25c
Iron bars, Cleveland	**4.30c**
Iron bars, Detroit	**4.00c**
Iron bars, St. Louis	4.25c
Iron bars, Cincinnati	**4.15c to 4.45c**
Iron bars, Philadelphia	4.25c
Iron bars, New York	**4.00c to 4.25c**
Shapes, Chicago	4.50c
Shapes, Detroit	4.50c
Shapes, St. Louis	4.55c
Shapes, St. Paul	4.60c
Shapes, New York	**4.50c**
Shapes, Cleveland	**4.60c**
Shapes, Philadelphia	4.50c
Shapes, Buffalo	**4.60c**
Shapes, Cincinnati	4.60c
Plates, Chicago	**6.00c**
Plates, Detroit	**5.50c**
Plates, St. Louis	**6.05c**
Plates, St. Paul	**6.10c**
Plates, New York	6.00c
Plates, Cleveland	**5.50c**
Plates, Philadelphia	6.50c
Plates, Cincinnati	6.00c
No. 10 blue anl. sheets, Chicago	5.75c
No. 10 blue anl. sheets, Clevel'd	6.00c
No. 10 blue anl. sheets, Buffalo	**4.50c**
No. 10 blue anl. sheets, St. L.	5.80c
No. 10 blue anl. sheets, Cincin.	5.75c
No. 10 blue anl. sheets, St. Paul	6.00c
No. 10 blue anl. sheets, Detroit	5.75c
No. 28 black sheets, Chicago	6.25c
No. 28 black sheets, Cleveland	6.25c
No. 28 black sheets, Cincinnati	5.65c
No. 28 black sheets Detroit	5.90c
No. 28 black sheets, St. Louis	**6.30c**
No. 28 black sheets, St. Paul	**6.50c**
No. 28 galv. sheets, Chicago	**7.75c**
No. 28 galv. sheets, Cleveland	8.00c
No. 28 galv. sheets, Cincinnati	**7.50c**
No. 28 galv. sheets, Detroit	8.00c
No. 28 galv. sheets, St. Louis	8.10c
Hoops, Cleveland	**5.50c**
Hoops, Detroit	**4.75c**

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	17.00
Bundled sheets, Cleveland	16.00 to 16.25
Bundled sheets, Buffalo	15.50 to 16.00
Frogs, switches, guards, St. L.	27.50 to 28.00
Heavy melting steel, Pittsburgh	28.00 to 30.00
Heavy melting steel, Buffalo	25.00 to 26.00
Heavy melting steel, Chicago	27.25 to 27.75
Heavy melting steel, Cleveland	26.00 to 27.00
Heavy melting steel, Cincinnati	24.00 to 25.00
Heavy melting steel, eastern Pa.	**24.50 to 25.00**
Heavy melting steel, New York	22.00 to 22.50
Heavy melting steel, St. L.	28.00 to 29.00
Heavy melt'g steel, Birmingham	18.00 to 19.00
Hydraulic pressed sheets, Cleve.	21.00 to 22.00
Hydraulic pressed sheets, Pitts.	21.00 to 22.00
Hydraulic pressed sheets, Chgo.	19.50 to 20.00
Low phos. steel, Buffalo	**33.00 to 36.00**
Low phos. steel, Pittsburgh	34.00 to 35.00
Low phos. steel, eastern Pa.	**33.00 to 35.00**
Shoveling steel, Chgo	25.50 to 26.00
Shoveling steel, St. Louis	23.00 to 24.00
Steel rails, short, Chicago	32.50 to 33.00
Steel rails, short, Cleveland	30.00 to 31.00

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—

New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	83.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.0 cents

Steel rails, short, St. Louis	$29.50 to 30.00
Steel rails, old, Birmingham	**21.00 to 22.00**
Stove plate, Chicago	14.00 to 14.50
Stove plate, Cleveland	15.50 to 16.00
Stove plate, Cincinnati	13.25 to 13.75
Stove plate, St. Louis	14.00 to 14.50
Stove plate, N. J. points	**16.00 to 16.50**
Stove plate, Birmingham	**11.50 to 12.00**
Stove plate, Buffalo	16.50 to 17.00
Stove plate, eastern Pa.	**18.00 to 18.50**
Stove plate. Pittsburgh	15.00 to 15.50

(Net Tons)

Boiler plate, cut, No. 1, Chicago	**18.00 to 18.50**
Boiler plate, cut, No. 1, St. L.	16.00 to 16.50
Bundled sheet, Cincinnati	14.25 to 14.75
Knuckles, coup., Chicago	**29.75 to 30.25**
Knuckles, coup., St. Louis	27.50 to 28.00
Springs, Chicago	30.50 to 31.00

IRON MILL USE

(Gross Tons)

Angle bars, st. sect., Pbgh., base	**2.75c to 3.25c**
Angle bars, st. sections, Chgo.	**2.75c to 3.00c**
Busheling No. 1. Buffalo	21.50 to 22.00
Busheling, No. 2, Buffalo	14.00 to 14.50
Busheling, No. 1, Pittsburgh	20.00 to 21.00
Cast borings, New York	12.50 to 13.00
Cast borings, eastern Pa	15.50 to 16.50
Cast borings, Buffalo	13.00 to 13.50
Cast borings, Pittsburgh	14.50
City wrought, New York	**24.00 to 24.50**
Cut forge, Chicago	27.50 to 28.00
Forge flash'gs, un. 10 in., Cleve.	22.00 to 22.50
Forge flash'gs, ov. 10 in., Cleve.	21.00 to 21.50
Forge, No. 1, eastern Pa	18.00 to 18.50
Grate bars, Buffalo	16.50 to 17.00
Grate bars, N. J. points	**16.00 to 16.50**
Iron axles, Pittsburgh	45.00 to 50.00
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, eastern Pa	**38.00 to 40.00**
Iron axles, Chicago	41.00 to 42.00
Iron axles, Buffalo	**45.00**
Iron rails, Chicago	33.00 to 33.50
Iron rails, Buffalo	26.00 to 26.50
Iron rails, Cincinnati	27.50 to 28.00
Iron rails, St. Louis	30.50 to 31.50
Iron rails, Cleveland	30.00 to 31.00
Machine shop turnings, Buffalo	**11.50 to 12.00**
Mch. shop turnings, New York	**12.00 to 12.50**
Mach. shop turnings, Pittsburgh	**13.50 to 14.00**
Mch. shop turnings, eastern Pa.	**14.50 to 15.00**
Mch. shop turnings, Birmingham	**8.50 to 9.00**
R. R. and mch. cast, No. 1, Bfl.	24.00 to 24.50
R. R. wrought, No. 1, Buffalo	29.00 to 30.00
R. R. wrgt., No. 1, eastern Pa.	35.00 to 37.00
R. R. wrought, No. 1, Pittsburgh	**28.00 to 30.00**
R. R. wrought, No. 1, B'ham	**21.00 to 22.00**
Wrought pipe, Buffalo	19.50 to 20.50
Wrought pipe, East Pa	20.50 to 21.00
Wrought pipe, New York	**18.50 to 19.00**

(Net Tons)

Angle bars, iron, Chicago	$33.50 to 34.00
Angle bars, steel, St. Louis	25.50 to 26.00
Arch bars and transoms, St. L.	33.00 to 34.00
Arch bars and transoms, Chgo.	34.00 to 34.50
Busheling, No. 1, Chicago	19.50 to 20.00
Busheling, No. 1, Cincinnati	**15.75 to 16.25**
Busheling, No. 1, Cleveland	20.00 to 20.50
Busheling, No. 1, St. Louis	19.00 to 19.50
Busheling, No. 2, Chicago	13.75 to 14.25
Cast borings, Cincinnati	9.50 to 10.00
Cast borings, Cleveland	11.75 to 12.00
Cast borings, St. Louis	10.50 to 11.00
Cast borings, Chicago	11.00 to 11.50
Grate bars, Cleveland	16.00 to 16.50
Iron axles, St. Louis	38.00 to 39.00
Iron axles, Cleveland	**43.00 to 44.00**
Machine shop turnings, Chicago	10.00 to 10.50
Mach. shop turnings, Cleveland	10.75 to 11.00
Machine shop turn'gs, Cincinnati	9.50 to 10.00
Mach. shop turnings, St. Louis	11.50 to 12.00
Pipes and flues, Cleveland	17.00 to 18.00
Pipes and flues, Chicago	17.00 to 17.50
Pipes and flues, St. Louis	18.00 to 18.50
Railroad wrought, No. 1, Cleve.	29.00 to 30.00
Railroad wrought, No. 1, Chgo.	30.50 to 31.00
Railroad wrought, No. 1, Cinci.	22.00 to 23.00
Railroad wrought, No. 1, St. L.	30.50 to 31.00
Railroad wrought, N. 2, Chgo.	28.00 to 28.50
Railroad wrought, No. 2, St. L.	28.50 to 29.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$17.50 to 18.00
Axle turnings, Buffalo	18.00 to 18.50
Shafting, New York	28.50 to 29.00
Shafting, eastern Pa	31.00 to 33.00
Steel car axles Birmingham	35.00 to 36.00
Steel car axles, New York	42.00 to 43.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	**43.50 to 44.00**
Steel car axles, Pittsburgh	45.00 to 50.00
Steel car axles, eastern Pa.	**41.00 to 43.00**

(Net Tons)

Shafting, St. Louis	27.00 to 27.50
Steel car axles, St. Louis	39.00 to 40.00
Steel car axles, Chicago	43.00 to 44.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pittsburgh	**24.00 to 25.00**
Car wheels, (steel), Pittsburgh	29.00 to 30.00
Car wheels, Chicago	24.50 to 25.00
Car wheels, eastern Pa	26.00 to 27.00
Car wheels, Buffalo	**24.00 to 24.50**
Car wheels, New York	21.50 to 22.50
Car wheels, St. Louis	23.50 to 24.00
Car wheels, Birmingham	**17.50 to 18.00**
Car wheels, Cleveland	22.00 to 23.00
Cast, No. 1, N. J. points	24.50 to 25.00
Cast, No. 1, eastern Pa	27.00 to 28.00
Cast, No. 1, Pittsburgh	**23.50 to 24.00**
Cast, No. 1, Birmingham	18.00 to 19.00
Malleable railroad, Cincinnati	15.00 to 15.50
Malleable railroad, Cleveland	22.50 to 23.00
Malleable railroad, Buffalo	24.00 to 24.50
Malleable railroad, Pittsburgh	21.50 to 22.50
Malleable railroad, eastern Pa	19.50 to 20.50
Tram car wheels, Birmingham	**16.50 to 17.00**

(Net Tons)

Cast, No. 1, Chicago	21.00 to 21.50
Cast, No. 1, Cincinnati	19.75 to 20.25
Cast, No. 1, St. Louis	21.50 to 22.00
Malleable railroad, Chicago	**20.50 to 21.00**
Malleable railroad, St. Louis	20.50 to 21.00
Malleable agricultural, Chicago	17.00 to 17.50
Malleable agricultural, St. Louis	17.50 to 18.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	32.00 to 34.00
Reroll. rails, 5 ft. & ov., Chgo.	33.00 to 34.00
Reroll. rails, 5 ft. & ov., E. Pa.	**32.00 to 33.00**
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or ov., Cleve.	32.00 to 33.00
Reroll. rails, 5 ft. or ov., Birm.	30.00 to 31.00

(Net Tons)

Boiler punchings, Chicago	25.50 to 26.00
Locomotive tires, Chicago	39.50 to 40.00
Locomotive tires, St. Louis	37.00 to 39.00

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Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

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Garwood Bronze & Iron Works, Garwood, N. J.
Knox Pressed & Welded Steel Co., Pittsburgh.
Mesta Machine Co., Pittsburgh, Pa.
Pittsburgh Annealing Box Co., Pittsburgh, Pa.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Pittsburgh Valve Foundry & Const. Co., Pittsburgh, Pa.
Swedish Crucible Steel Co., Detroit, Mich.
United Engrg. & Foundry Co., Pittsburgh, Pa.
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Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ASH BUCKETS.
Lakewood Engrg. Co., Cleveland, O.

AUTO TOWING CABLES.
American Steel & Wire Co., Chicago, Ill.

AUTO TRUCKS.
Federal Motor Truck Co., Detroit, Mich.

AXLES.
American Bridge Co., New York City.
American Steel Export Co., New York City.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Cambria Steel Co., Philadelphia, Pa.
Camden Forge Co., Camden, N. J.
Carnegie Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
National Tube Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.

AXLE LATHES.
Bridgeford Mch. Tool Wks., Rochester, N. Y.

BABBITT METAL.
Keystone Bronze Co., Pittsburgh, Pa.
Lubricating Metal Co., The, New York City.
Ryerson, Jos., T., & Son, Chicago, Ill.

BAKERS, WIRE COATING.
Morgan Construction Co., Worcester, Mass.

BAKERS (Wire Coating and Bluing).
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BALE TIES.
American Steel & Wire Co., Chicago, Ill.

BALLS (Brass and Bronze).
Auburn Ball Bearing Co., Rochester, N. Y.

BALLS (Steel).
Auburn Ball Bearing Co., Rochester, N. Y.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.

BANDERS (Hydraulic for Projectiles).
Southwark Foundry & Mch. Co., Philadelphia.
West Tire Setter Co., The, Rochester, N. Y.

BAND (Steel).
Akron-Selle Co., The, Akron, O.
Carnegie Steel Co., Pittsburgh, Pa.
Interstate Iron & Steel Co., Chicago, Ill.

BARBED WIRE FENCE (Equipment).
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BARGES (Steel).
American Bridge Co., New York City.

BARS (Concrete Reinforcing).
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Ryerson, Jos. T., & Son, Chicago, Ill.
Trussed Concrete Steel Co., Detroit, Mich.
Upson Nut Co., Cleveland, O.

BARS (Iron and Steel).
American Bridge Co., New York, N. Y.
American Iron & Steel Mfg. Co., Lebanon, Pa.
American Steel Export Co., New York City.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bingham, W., Co., The, Cleveland, O.
Bourne-Fuller Co., Cleveland, O.
Brown-Wales Co., Boston, Mass.
Cambria Steel Co., Philadelphia, Pa.
Camden Forge Company, Camden, N. J.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Harvey, Arthur C., Co., Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Trussed Concrete Steel Co., Detroit, Mich.
United Alloys Steel Corp., The, Canton, O.
Upson Nut Co., Cleveland, O.
Westerman & Co., Lockport, N. Y.

BARS (Tin).
Andrews Steel Co., Newport, Ky.

BEAMS, CHANNELS AND ANGLES.
American Steel Export Co., New York City.
Belmont Iron Works, Philadelphia, Pa.
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Chesapeake Iron Works, Baltimore, Md.
Empire Art Metal Co., College Pt., N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.

BEARINGS (Ball).
Auburn Ball Bearing Co., Rochester, N. Y.
New Departure Mfg. Co., Bristol, Conn.

BEARINGS (Ball Thrust).
Auburn Ball Bearing Co., Rochester, N. Y.

BEARINGS (Vanadium Steel).
American Vanadium Co., The, Pittsburgh, Pa.

BELT CEMENT AND DRESSING.
Dixon, Jos., Crucible Co., Jersey City, N. J.
Graton & Knight Mfg. Co., Worcester, Mass.
Texas Company, The, New York City.

BELT LACING (Leather).
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.

BELTING (Chain).
Link-Belt Company, Chicago, Ill.

BELTING (Leather).
Bingham, W., Co., The, Cleveland, O.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.

BENCHES (Steel).
New Britain Mach. Co., New Britain, Conn.

BENCHES AND FRAMES (Drawing).
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., The, Cuyahoga Falls, O.

BENDING AND STRAIGHTENING MACHINES.
Abramsen Engrg. Co., Pittsburgh, Pa.
Bertsch & Co., Cambridge City, Ind.
Birdsboro St'l Fdy. & Mch. Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Philadelphia, Pa.
Hinman, D. A., & Co., Sandwich, Ill.
Lourie Mfg. Co., Springfield, Ill.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Niles-Bement-Pond Co., New York, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

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